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ORIGINAL ARTICLES.

LEUKÆMIA AND PREGNANCY.[1]

With Report of a Case.

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THE purpose of this communication is to place on record an example of fatal lienal leukæmia, that seems to have sustained some necessary relation to pregnancy, or to prolonged lactation during pregnancy, or to both these factors.

The notion of some necessary relation between the female generative organs and leukæmia has long been accepted. Thus Virchow,[2] the discoverer of leukæmia, writes on the etiology of the disease:

"The only thing that can be asserted with any degree of certainty is the connection with the sexual functions in woman."

And Mosler[3] says:

"Disturbances of the sexual functions in woman have an influence in the origin of leukæmia that is unmistakable. There exists a certain connection between the female genital organs and spleen. An acute splenic tumor with slight increase of the white blood-corpuscles often arises in consequence of anomalies of menstruation."

Within a recent period, however, the nature of the evidence upon which this notion rests has been called in question by Sänger,[4] in an excellent critical review of the literature of the subject. This testimony, he writes, is not the language of modern gynecology.[5]

"The question, up to the present surrendered entirely to internal medicine, must be investigated anew by gynecologists, who hitherto have interested themselves in leukæmia and splenic tumors only in their relation to differential diagnosis for the purpose of laparotomy."

It is a fact that leukæmia occurs twice in men to once in women. Among 91 cases Ehrlich found 60 males and 31 females, while among 201 cases Birch-Hirschfeld found 135 males and 66 females. This unequal occurrence exists in spite of, or perhaps on account of, the greater demands on the blood-glandular system of women. Now, if menstrual disturbance, so commonly observed, were always of primary, causal moment, the world would swarm with leukæmics. On the other hand, does it not seem probable that the more active blood-metabolism is the factor that tends to shield the female sex from leukæmia?

On the reciprocal relations of leukæmia and menstruation it can be said that in most cases the menstrual blood-flow is lessened in the course of the disease even to the degree of complete amenorrhœa. Oligomenorrhœa and amenorrhœa, however, are secondary. They arise in consequence of the leukæmic blood-dyscrasia, just as they occur in chloro-anæmia, in the anæmia of obesity, in pulmonary tuberculosis and after severe hæmorrhages. With reference to sudden suppression of the menses, whose causal importance is insisted upon by Mosler, it is more probable that the same pernicious influence that effected the suppression at the same time produced the leukæmia.

It is alleged that among women the climacteric period has the greatest number of cases, and Mosler goes so far as to attach causal significance to the senile retrograde changes in the genitalia. But it is irrational to suppose, as he does, in a single case that the numerous severe labors and abortions with considerable loss of blood should first avenge themselves at the menopause instead of immediately upon the reception of the injury. And, in general, it may be remarked that the recorded cases furnish no evidence that can incriminate the change of life.

No evidence whatever has been presented to prove a connection between primary affections of the ovaries and secondary leukæmia. It has been shown, however, that in the course of leukæmia these organs, or their analogues, are sometimes involved. Hérard demonstrated the formation of lymphomata in the ovaries in one case; Robin, in the testicles; Gillot, in the mammary glands.

The coincidence of pregnancy and leukæmia is rare. Still, in the cases of Cameron, Greene and Sänger conception occurred. Accordingly, the conclusion is justified that leukæmia, as such, does not inhibit capability to conceive, but, at the most, limits the function, though even limitation is not probable, since repeated conceptions have been observed in leukæmia.

From these considerations the opinion seems justified that disturbances of menstruation, of ovula-

[1] Read before the Chicago Medical Society, June 16, 1890.

[2] Gesammelte Abhandlungen, Frankfurt, 1856, p. 209.

[3] Die Pathologie und Therapie der Leukämie, Berlin, 1872, p. 113.

[4] Ueber Leukämie bei Schwangeren, etc.

[5] Archiv für Gyn., Bd. xxxiii. H. 2.

tion and of conception in leukæmia have either a secondary significance or are entirely independent of the disease.

Turning now to the connection between pregnancy and leukæmia, it seems to me that the evidence in hand does not warrant Sänger's absolute denial of all causal relation.

The history of my case is briefly as follows:

Mrs. F. G., thirty-four years old; born in Boston of German parents; wife of a mechanic; VI.-para. When in health a large, fine-looking woman, five feet four inches in height, 150 pounds in weight. Menstruation, established in sixteenth year, was regular every four weeks, painless and of three days' duration.

No serious illness during girlhood with the exception of an attack of "inflammation of the bowels" that lasted six weeks during her fourteenth year. No history of syphilis, alcoholism, injury nor of rheumatism. Patient has lived in Boston, Mass.; Milwaukee and Menasha, Wis., and in Chicago, and never suffered from malarial infection.

Married Jan. 12, 1875, while in her twentieth year.

First child, male, born February 1, 1876, died of cholera infantum when eight months old (Dr. Root's certificate).

Second child, male, born September 7, 1877, nursed sixteen months; living and in health.

Third child, female, born November 12, 1879, nursed sixteen months; living and in health.

Fourth child, male, born May 4, 1882, nursed eighteen months; living and in health.

Fifth child, female, born December 12, 1886, nursed during her sixth pregnancy up to and on the morning of her confinement, July 8, 1888; child is now living and in health.

Sixth child, female, born July 8, 1888, small (premature). This child she was not able to suckle. At the end of the first week the child was artificially fed and died in convulsions at the end of the third week.

All her labors were easy and rapid. She was attended exclusively by a midwife. No miscarriages. With the exception of the sixth all the children large and vigorous. The four survivors, seen and examined June 1, 1890, present every appearance of health.

The course of the sixth pregnancy was normal. Three weeks before the sixth labor patient was a large and apparently healthy woman, with well-developed bust, and weighed 158 pounds. At this time she had a photograph taken, because, to use her own words, "she never looked so well."

Sixth puerperium, with the exception of the failure of lactation, was apparently normal. At the end of ten days she was up and at work as usual. At this time she first noticed stinging paroxysmal pains in the region of the left hypochondrium, although no tumor was perceptible. About six weeks after labor, August 22, 1888, menstruation was reëstablished, but was very scanty.

Menstruation for the second and last time, January 2, 1889; scanty.

Pains of a lancinating character in the region of the spleen became more severe, the loss of weight was progressive and weariness and general malaise became marked. About eight weeks after this labor she first noticed, and called to her husband's attention, a painful lump in the region of the left hypochondrium, which seemed to grow in size from week to week. Finally she consulted her physician, Dr. Glenn M. Hammon, of Chicago, who made an examination, January 21, 1889. He writes: "I found a large, densely hard nodular mass extending downward from the spleen and filling nearly the whole of the left half of the abdominal cavity. It was easily outlined because of the emaciation. There were no other glandular enlargements. There was considerable pain of a lancinating character." The case came under my observation January 31, 1889, and remained under my control for four weeks. Patient greatly emaciated, pulse 116, temperature 100.3° F. Heart, lungs, and liver negative. Urine free from sugar and albumin. Palpation of the abdominal tumor, rendered easy by the disappearance of the panniculus adiposus and by the marked diastasis of the recti, revealed an enormously enlarged spleen that filled out the left half of the abdominal cavity and below the navel extended obliquely to a point near the right iliac fossa. The hilum and the free notched anterior margin were easily outlined. The organ, symmetrically enlarged and immobile, was painful spontaneously and on pressure. There were some ascites and slight œdema of the legs and feet.

Pelvic genitalia absolutely normal.

Lymphatic glands and long bones negative.

A drop of blood, notably viscid, showed an enormous increase of the white corpuscles. The white corpuscles apparently equalled in number the red disks.

Diagnosis.—Leukæmia lienalis.

February 4, 1889, Dr. Frank Billings saw the case with me, and together we made a careful examination of the blood.

Blood-count (Hayem's hématimèter).—Red disks, per c.mm., 3,255,000; white corpuscles, per c.mm., 1,178,000; ratio of white to red as 1 : 2.7+.

On account of the viscidity of the fluid, due to the increase of white corpuscles, we encountered difficulty in the estimation of the hæmoglobin by Gowers's instrument. After many trials, however, we were successful, and fixed the quantity at 50 per centum. At this time we went over the history of the case and made a thorough physical examination, but discovered nothing new. We detected no enlargement of lymphatic glands, no change in the bones.

Retina not examined.

Family history good. Both parents aged, but in health. Blood of father and only sister (II.-para) upon examination, normal.

Prognosis.—Absolutely unfavorable.

Treatment.—Nutritious food, arsenic, iron, anodynes.

Subsequent course of disease. — February 11. Paroxysms of terrible pain; vomiting large quantities of blood. Diarrhœa; dejecta streaked with

blood. Rapid progressive emaciation. Pain always referred to the splenic tumor. Dr. J. M. Hutchinson, of Chicago, who saw the case later, kindly informs me that the paroxysms of terrible pain, always accompanied with violent vomiting, continued, the tumor increased in size, considerable ascites and œdema of the feet and legs developed; and that cachexia and emaciation progressed.

A few days before death patient weighed less than 100 pounds.

She remained conscious to within three hours of death, which occurred June 27, 1889. Autopsy could not be obtained.

This case presents several points of interest:

1. The certificate, returned to the city Board of Health, I am informed, assigns cancer of the spleen as the cause of the death of this woman. Now, as an ingenious figure of speech, it may be permissible to speak of leukæmia as carcinoma of the blood (Bard), or as sarcoma of the blood (Sänger), but it is a gross error to call a leukæmic spleen a cancer. Under adequate microscopical examination of the blood is it not possible that some of the examples of splenic cancer and of ague-cake reported here and elsewhere might be resolved into instances of leukæmia?

2. Exploratory laparotomy was actually proposed and very seriously considered in this case. But in view of the professional insanity that has attended the evolution of the "abdominal instinct," this proposal cannot be regarded as phenomenal. Splenotomy, according to Collier, has been performed in 29 cases. Out of these, 18 were in cases of leukæmia —all patients died immediately after the operation. Of the rest, 61 per cent., recovered. The operation of extirpation of the leukæmic spleen is justly looked upon as an art error.

3. The family history of the patient is good. As before remarked, the father and mother, though aged, are in excellent health. The only sister is the healthy mother of a robust child. The patient's four living children are sound and active.

4. The history of the case seems to point to some necessary relation between pregnancy or between prolonged lactation during pregnancy, or both these factors, and the leukæmia. The evidence, indeed, is only probable, but it is sufficient to create a presumption. As pertinent to the discussion, I beg to submit the following sentence, taken from the Introduction of Butler's *Analogy:*

"In questions of difficulty, or such as are thought so, where more satisfactory evidence cannot be had or is not seen, if the result of examination be that there appears upon the whole the lowest presumption on any one side and none on the other, or a greater presumption on one side, though in the lowest degree greater, this determines the question even in matters of speculation, and in matters of practice will lay us under an absolute and formal obligation, in point of prudence and of interest, to act upon that presumption or low probability, though it be so low as to leave the mind in very great doubt which is the truth."

This view of the nature of the case receives some support from its antecedent probability. During gestation the organs of the blood-glandular system, notably the spleen, the thyroid and lymphatic glands, increase in size and their functional activity is augmented. According to Birch-Hirschfeld,[1] the normal average weight of the spleen in the non-gravid woman is 140 grammes, while at term it is 180 grammes. Virchow says that the number of white corpuscles is normally increased during pregnancy. Sänger, indeed, questions the evidence upon which this assertion rests, but he does not prove that the physiological leucocytosis does not occur. Clinical experience teaches that physiological processes are liable to undergo pathological exaggeration during pregnancy. Restricting attention to the blood we have examples of the truth of this statement in the chlorosis, hydræmia, and pernicious anæmia of the gravid woman. It is conceivable that under certain conditions the physiological leucocytosis of pregnancy and the normal splenic hypertrophy may undergo pathological exaggeration and terminate in leukæmia. This notion is not forced nor strange, but is altogether in harmony with what we know of the constitution and the course of nature.

As to the exact effects of lactation during the usual period, upon the blood-glandular system but little is known, and our ignorance is still greater when we come to lactation during pregnancy. From carefully conducted examinations of the mammary glands of guinea-pigs, during and after pregnancy, Rauber concludes that:

"Milk owes its origin to the entrance of countless leucocytes into the lumen of the gland-vesicles. The emigrated lymphoid elements penetrate the alveolar walls, passing through the single layer of epithelial cells which lines them. Arrived in the interior of an ultimate acinus, the leucocytes undergo fatty metamorphosis and thus furnish the most essential and characteristic ingredient of milk, viz., the milk-globule."

Satterthwaite says:[2]

"Thus the primitive opinion advanced by Empedocles, describing milk as white pus, is in a measure revived, and milk is held to be directly derived from the white corpuscles of the blood."

But, as at present informed, Rauber's ingenious hypothesis has never been definitely corroborated, and it is not positively asserted that in this case the excessive demand by the lacteal secretion upon the white corpuscles was the cause of the splenic tumor.

The probable time of the commencement of the leukæmia in this case coincides with the latter days of the sixth pregnancy. This is the period

[1] Berliner klin. Wochenschrift, 1878, p. 324.

[2] Manual of Histology, 1881.

when the blood-glandular organs are most severely taxed by pregnancy itself. Add to this the additional strain of suckling a vigorous babe, and it seems that there is presented a cause adequate to the phenomenon.

This proposition rests chiefly upon the history of the case, obviously a precarious basis. Still, three weeks before labor the woman was the picture of health, as shown by her photograph, and by her weight, 158 pounds. Soon after labor and after the failure of the milk the pains were felt in the side, and the splenic tumor, small then, appeared. All these facts fix with tolerable accuracy this time as the date of the commencement of the disease. This impression is confirmed by the duration and by the character of the course of the disease. The patient died eleven months and nineteen days after her sixth confinement, and the course of the disease was steadily progressive.

Out of the 63 cases tabulated by Gowers, the duration of the disease was under a year in the 13 examples whose symptoms more or less closely resemble the clinical picture of this case, and in general the average duration of the malady may be reckoned as between one and two years (Eichhorst).

The history of the case offers no other explanation of the leukæmia. Trauma, syphilis, alcoholism, can be absolutely excluded. The patient never resided in a malarial region, and to the best of her knowledge never suffered from malarial infection.

A few cases have been published that seem to point to a causal relation between some phase of the puerperal state and leukæmia. Sänger, indeed, insists that this connection has never been established. On the one hand, he thinks that pregnancy does not affect the origin or course of leukæmia; on the other hand, he seeks to prove that leukæmia affects pregnancy in the determination of premature labor only indirectly by the greatly increased intra-abdominal tension, on account of the presence of the splenic tumor, ascites, meteorism of the intestines and the like. "The leukæmic quality of the blood, as such," he writes, "does not need to be invoked in explanation." But, as before remarked, the weight of evidence, as it seems to me, is in favor of the older view, of some necessary reciprocal relation between pregnancy and leukæmia. For my purpose, it is sufficient to mention merely one old and three new cases.

Leube[1] and Fleischer describe a case of a myelogenic leukæmia. A woman, strong and healthy up to the time of examination, developed four months after a normal labor, signs of a somewhat rapidly increasing leukæmia, without demonstrable cause. There were impairment of nutrition and strength, syncope, headache, anorexia, and also painfulness and swelling, which finally in part disappeared, of the left lower extremity. Five weeks later, there were signs of a high degree of anæmia, blowing murmur over the heart and a small compressible pulse. No enlargement of spleen, liver, or lymphatics. The number of red corpuscles was significantly decreased and there were both relative and absolute increase of the white corpuscles. The left tibia and left tarsus were painful on pressure. On account of rapidly increasing gangrene of the skin, amputation of the left foot was performed and was followed by death, six days later. Section revealed extreme anæmia of all internal organs, advanced degeneration of the cardiac muscle and chronic ulcer of the stomach, but no change in the liver, spleen or lymphatics. The bone-marrow was red and hyperplastic, with numerous nucleated red blood-corpuscles (transition forms, and numerous marrow cells).

According to Osler's[1] interpretation:

"This was no doubt a case of post-partum anæmia aggravated by the presence of ulcer of the stomach, and the great interest of the case lies in the transition of the anæmia into leukæmia."

In Cameron's[2] case, there were presented among others, the following points of interest:

"1. Splenic tumor was first noticed by her at the beginning of her sixth pregnancy."

"2. Spleen and liver always enlarge during pregnancy and become tender."

"3. The progressively enormous increase of white cells and decrease of red cells, as pregnancy advances.

"4. The rapid subsidence of œdema and dyspnœa after the termination of labor, together with the rapid increase of red and decrease of white cells."

Of the later course of this case, Dr. Cameron, under date of June 3, 1890, writes me:

"My patient is still living and has been confined twice since the Washington meeting. The first time she made an excellent recovery and regained her health so much that she was able to do all her own housework. The child was premature and died very shortly after birth, but was quite free from all trace of leukæmia. During her last pregnancy her health was poor. She became very anæmic and suffered so much from dyspnœa, palpitation, and threatenings of heart-failure that I was obliged to induce labor about the seventh month. The fœtus had perished some days previously. She barely escaped with her life, and is slowly going down-hill. The splenic tumor and her blood-count remain about the same."

James L. Greene's[3] report of two cases, of leukæmia, so sharply criticised by Sänger, while defective, is still of a certain value. His first case, during a first pregnancy, was an example of acute lienal leukæmia that was fatal within six months of the apparent outset. Although malarial infection cannot be

[1] Ein Beitrag zur Lehre von der Leukæmie, Virchow's Archiv, lxxxiii. p. 1124.

[1] Pepper's System of Medicine, vol. iii. p. 920.

[2] Transactions of the International Medical Congress, Ninth Session, Washington, 1887. Vol. ii. p. 330.

[3] New York Medical Journal, February 11, 1888. p. 144.

absolutely excluded in this case, the course of the disease creates the presumption that malaria, if present, must have played a minor *rôle*. It is to be hoped that the history of Greene's second case will be filled out in the near future, since, as at present described, the diagnosis of leukæmia, to say nothing of the variety, is not established. The case is that of a young primipara, the sister of the patient of the first example, who suffered from symptoms pointing to leukæmia. Upon the artificial induction of abortion, the patient promptly recovered. Of this case, Dr. Greene, under the date of May 30, 1890, writes me:

"The second case mentioned by me, Mrs. C., has conceived since the report was published, and with this condition returned all of the symptoms of leukæmia. An abortion was produced and she regained her health as before."

On account of the antecedent probability of the view, on account of the coincidence of the apparent onset of the disease with the later days of pregnancy, on account of the absence of any other demonstrable adequate cause, and finally, on account of the evidence accumulated from the cases cited, it seems to me to be highly probable, that in this case, the leukæmia sustained some necessary relation to pregnancy, or to prolonged lactation during pregnancy, or to both these factors.

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RECENT OBSERVATIONS IN THE ETIOLOGY AND TREATMENT OF MIGRAINE.[1]

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IT has seemed to me well to gather together some of the experience of the past few years in the treatment of migraine, and to cull from the journals and elsewhere what is of value in regard to conditions which may cause it.

This form of headache is of unending interest to the medical profession, for its cure or the alleviation of the paroxysms is a constant problem. Moreover, as Gowers remarks, "The disease is often associated with high intellectual ability and many distinguished men have suffered from it and have supplied more careful observations of the subjective symptoms than we possess of any other malady." We may almost say of it, as Sydenham said of gout, that "More rich men than poor men and more wise men than fools, are victims of the affection." Among the prominent men who have had migraine are DuBois-Reymond, Dr. Fothergill, Dr. Lauder Brunton, Dr. Anstie, Sir John Herschell, Sir George Airy and his son, Dr. Hubert Airy, and we all have among our own medical friends many who suffer from attacks. It is by no means, however, confined to the more prosperous classes, for we meet with it in all conditions of men and at all ages.

The attacks of migraine from uterine disorders have been known to the profession for years, and there is a large amount of literature on the subject. Recently much has been written on headaches from eye-strain and many of these are of the hemicranic type. Numerous cases have been reported which have been relieved by correcting refraction errors of the eye. The connection between migraine and disorders of vision has been pointed out by several authorities, amongst others, Mr. John Tweedy, Dr. Savage,[1] Mr. Carter, Dr. William Thomson, Dr. S. Weir Mitchell,[2] and quite lately, by Dr. George F. Stevens,[3] whose writings on the relief of various disorders of the nervous system by tenotomy of the ocular muscles have attracted much attention. This author thinks that ocular defects play a conspicuous *rôle* as causative conditions in migraine. He refers to a few cases of "blind headache" in which the fundus of the eye was examined during the period of visual disturbance preceding an attack. The retina has been found pale and brilliant, the optic nerve unusually white, and the main arteries somewhat irregularly contracted in their course. In these cases the field of vision was found to be contracted in a striking manner, in some cases, one-half of the field being lost, and in others the central field was gone and imperfect sight remaining in the periphery. He finds that, unlike ordinary forms of headache, hemicrania does not easily yield to the simple measure of adapting glasses to correct refraction errors. It is often caused by a complication of refraction trouble and muscular insufficiency. This requires tenotomy and suitable glasses. Mr. Bendelack Hewetson[4] has removed migraine by paralyzing the power of accommodation by atropine. Henry S. Oppenheimer[5] considers eye-strain to be a frequent cause of headache and believes that it is often overlooked. He relates a case of headache and severe tinnitus aurium cured by the proper application of prisms combined with convex cylinders.

He recommends in the treatment of headaches from eye-strain, first, that all hygienic and medical indications be carefully carried out; secondly, a most careful correction of the refraction and accom-

[1] Read before the Association of American Physicians, May 14, 1890.

[1] Medical and Surgical Reporter, July 29, 1882.

[2] Ibid., July 25, and Aug. 1. 1874.

[3] Functional Nervous Diseases, by George T. Stevens, M.D. New York, 1887.

[4] The Relation between Sick Headache and Defective Sight. Leeds, 1885.

[5] Headaches and other Nervous Symptoms caused by Functional Anomalies of the Eye. Gaillard's Medical Journal, New York, January, 1889.

modation; thirdly, correction of muscular insufficiencies by prisms, beginning with a low degree and, when necessary, increasing in power; and should this prove insufficient, tenotomy.

T. Lauder Brunton[1] speaks of migraine from caries of the teeth. He says:

"The most common causes of headache, indeed, are decayed teeth and irregularities of vision. When the teeth are decayed rinsing out the mouth with a lotion of bicarbonate of sodium, or applying a little cocaine to the exposed pulp will relieve the headache."

He refers to his own case in which, during the attack, the pain was limited to a spot in the left temple. On one occasion he accidentally discovered, under the angle of the jaw, a small gland, which was hard and painful to the touch. This led him to examine his teeth, and these he tested by percussing with a steel instrument until he discovered a tender spot on the last lower molar on the left side. He went to a dentist who found that caries had begun at that spot but had, as yet, caused no cavity.

He also describes the case of a clergyman who began to suffer from headaches so intense as completely to incapacitate him. He took various medicines in vain and went for a continental tour, but came back little benefited. Dr. Brunton saw him shortly after his return and examined his teeth, all of which looked healthy. He then took a steel bodkin and probed and percussed each tooth in succession until he came to one which was tender. The dentist found that this tooth was carious. It was properly filled, and the headaches disappeared.

He further says:

"In cases of headache depending upon a decayed tooth when no toothache is felt, it is not improbable that the irritation in the tooth does not give rise directly to the sensation of pain in the head, but does so by acting through the sympathetic system on the vessels, so as to cause the spasm which leads to the sensation of pain."

J. S. Dixon[2] reports several cases in which the removal of carious teeth stopped attacks of hemicrania.

Dr. Louis Starr[3] speaks of headaches being frequent in children during the period of second dentition. He says:

"Headache is common. The pain is usually temporal or unilateral. It may be seated, however, in the occipital region or in different parts of the face, and sometimes shifts suddenly from the occiput to the temporal region. One or more painful points can often be detected and generally there is a hard, tender, markedly enlarged lymphatic gland in the sub-maxillary or cervical region."

He suggests that the method of production of the headache is one of direct nervous connection, the sub-maxillary ganglion acting, in the case of the lower teeth and the spheno-palatine in the case of the upper, as mediums of transfer of irritation to the vaso-motor nerves.

The nose and ear are now recognized as means by which external irritation may operate in producing headaches. Dr. Brunton[1] finds that in his experience headache depending on disease of the nose is at the top of the head just behind the commencement of the scalp, and headache here should always lead to an examination of the nose.

Dr. Hack, of Freiburg, (quoted by Brunton), has observed several cases, both of migraine and of frontal headache, depending upon congestion of the mucous membrane covering the anterior turbinated bones, and has been able to effect a radical cure in several cases by the application of the galvano-cautery to the inflamed and swollen mucous membrane.

Thomas E. McBride[2] relates four cases of migraine which were cured by relieving the post-nasal catarrh which had existed in each case.

Harrison Allen, in a paper read before the Philadelphia Neurological Society,[3] refers to a patient in whom merely touching the right middle turbinated bone with a probe instantly caused intense vertex pain. He reports a second case in which there were attacks of general headache and clavus over the right parietal eminence. In this patient he found disease confined to the middle turbinated bone on the right side. He also mentions the case of a lady in whom there were frequent attacks of "sick headache" which were dependent upon deep-seated infiltration of the pharynx. The headaches were removed by curing the pharyngeal disease.

John O. Roe[4] has contributed a paper on "The Frequent Dependence of Persistent and So-called Congestive Headaches upon Abnormal Conditions of the Nasal Passages."

Most of his cases had constant, dull, general headache, but in two or three the attacks were migraine, and were accompanied with nausea and vomiting. In all some obstructive disease was found in the nose and removal of the obstruction was followed by relief from the headaches.

Migraine has been known as a disorder of childhood for many years and I have elsewhere pointed out its frequency in very young children.[5] I have seen at least one case in which a child of two years had periodical attacks, with every characteristic of mi-

[1] Disorders of Digestion. London, 1888.

[2] Atlanta Medical and Surgical Journal, December, 1856, vol. ii. p. 201.

[3] A Study of the Relationship between the Eruption of the Permanent Teeth and the Ailments of late Childhood. Therapeutic Gazette, April 15, 1890, p. 228.

[1] Loc. cit., p. 107.

[2] THE MEDICAL NEWS, January 30, 1886, p. 136.

[3] On the Headaches which are Associated Clinically with Chronic Nasal Catarrh. THE MEDICAL NEWS, March 13, 1886, p. 289.

[4] New York Medical Record, August 25, 1888, p. 200.

[5] Transactions Philadelphia County Medical Society, 1887.

graine. A medical friend has described to me the case of one of his own children whom he believes to have had attacks of hemicrania from the age of two years. Gowers[1] says one-third of the cases begin between five and ten years of age.

Russell Sturgis[2] has described a form of recurrent headache in children, which he considers to be similar to the migraine of adults, with the difference that the pain is more likely to be across the forehead, and is less often confined to either side of the head than that of migraine. He describes these attacks as occurring in children of a nervous temperament, who sleep poorly, with bad dreams and night terrors, and who are fretful and often chilly and have a heavy expression about the eyes. There were in many of his cases optical illusions of sparks or spots, and bands of color. The treatment which he has used successfully in some twenty cases, consists in the administration of ten minim doses of the fluid extract of ergot, more being added if there is coëxisting anæmia. The ergot should be continued for several weeks after the cessation of the headaches.

Migraine sometimes begins late in life. A patient, whose case I shall report later, never had an attack until his thirty-eighth year, and Gowers speaks of a man in whom the attacks began at sixty years.

The visual phenomena of an attack of migraine have been discussed for many years. Lately some interesting cases of transient hemianopsia and unusual forms of scotomata have been reported. Dr. de Schweinitz has kindly given me an account of two cases in which the form of scotoma was unusual. In one it was described as being like the wavy appearance of heat rising from a chimney. The cases are as follows:

"A man, aged thirty-two, whose family physician reports general health good, and who, as far as my own examination is concerned, has no organic disease. For a number of years this patient has had attacks of typical migraine; the invariable prodrome is an appearance as if heat were rising in the air, which is followed by numbness of one hand, or else numbness of the tongue and, although of this I am not absolutely sure, aphasia. This condition lasts from fifteen to twenty minutes, sometimes as long as an hour, and is succeeded by a terrific explosion of hemicrania. His attacks average one a month, but they have occasionally come as often as once in two weeks. He has a moderately high degree of compound hypermetropic astigmatism, together with insufficiency of the internal recti of eight degrees in accommodation. There are no other muscular anomalies. He is at present under treatment for the eyes.

"The other case is one of a man aged forty-seven, typically neurasthenic, and of bilious temperament, who, for many years, has had severe migraine, the attacks averaging one every two weeks. He has no definite or always present prodrome, but in a certain number of instances this has consisted of a large, dark, circular object, composed from within outward of a dense black rim, a broader grayish-black circle, a central nucleus of yellow color, and a nucleolus of dense black. It is needless to remark that I, not he, have used these technical terms to describe it, but you observe that this curious appearance which he drew for me, contains the components of a compound cell, the dark outer rim corresponding to the capsule, the gray portion to the cell contents, the yellow spot to the nucleus, and the dark spot to the nucleolus. This patient has a high mixed astigmatism, with insufficiency of the external recti of four degrees."

Dr. Charles A. Oliver kindly referred to me a case of migraine in whom there existed that rather unusual condition of contraction and dilatation of the pupil known as hippus, in connection with the attacks of migraine, and in whom there were other interesting visual phenomena accompanying the attack. The following notes were made by Dr. Oliver:

"*January 8, 1886.* L. L., aged twenty-five years, unmarried.

"For two weeks past she has had a spasmodic action of the right iris, causing the pupil to dilate and contract irregularly; this spasmodic action being felt by the patient as a twitching or a series of movements. During the past eleven months she has had a number of severe attacks of migraine, blindness appearing simultaneously before the right side of each field of vision and quickly moving across to the left side, lasting for fifteen minutes and followed by clearing up of the visual fields in the same sequence; that is, commencing at the right periphery of each field and ending on the extreme left side. The attacks terminate with the usual signs of headache, nausea, etc. She has had the headaches, which have been worse at the time of menstruation, for several years. She complains of asthenopic symptoms and she has never worn glasses. She had four brothers and one sister, she being the third child. A younger brother had a 'cast' in his eye and the mother has worn glasses for years. The patient was overworked, neurasthenic, and her menses were scanty and irregular. Ocular symptoms show:

$$\infty \text{ O. D. V.} = \frac{5}{7}, \frac{1}{2}? \quad \text{Sn. } 1\tfrac{1}{2}\ 6''\text{–}26''.$$

$$\infty \text{ O. S. V.} = \frac{5}{7}, \frac{1}{2}. \quad \text{Sn. } 1\tfrac{1}{2}\ 6''\text{–}26''.$$

"Eyes are slightly *in* under hand-cover.

"The ophthalmoscope showed gray disks with a tortuous condition of somewhat undersized retinal veins, with the characteristic changes of disturbed ametropia. Patient was advised an estimation and correction of refraction error, but she refused to have glasses, thinking that rest from work would relieve the necessity for wearing them.

[1] Diseases of the Nervous System, 1888, p. 1172.

[2] Archives of Pædiatrics, 1889, vol. vi. p. 293.

"*November 5, 1886.* The last attack began as a large, central scotoma, which she says was about the size of a silver half-dollar, associated with fronto-temporal pain on both sides and lasting about twenty minutes, followed by numbness of the left upper extremity, commencing in the ring and little finger.

"Patient failed to report for over two years, when she stated that she had been free from attacks until the day when she was seen. This attack appeared as a central, blind area which was not surrounded by any brilliant lines or zigzags. This lasted for about fifteen minutes, and was followed by giddiness but no numbness. The right-sided hippus was again complained of, and upon careful study was found just as pronounced as at the previous examination. The iris excursions which were quite extensive were found to be fifteen times in each half minute upon monocular exposure, and but six times in the same length of time upon binocular exposure.

"The patient was next seen April 29, 1890. No attack until three weeks before, when one unexpectedly appeared four days before menstruation. Patient was then highly neurasthenic and nervous."

In June, 1887, Dr. S. Weir Mitchell read at the College of Physicians[1] a paper on some remarkable visual hallucinations, which took the place of the ordinary balls of light and zigzag lines which are so commonly met with as a precursor of an attack of headache. He relates four cases, the first of which is of so much interest that I will repeat it in full:

"Miss W., aged thirty, was in good general health, and able to bear great fatigue, and to use her mind and body incessantly as a teacher. About once a week for many years she had attacks of migraine of great severity. When nineteen years old she began, just before the headaches, to see a bright, gold-tinted cloud, and with it an appearance of parti-colored rain. There was most clouding of vision when the sequent pain was over the right eye, and these visual phenomena were not constant. When twenty-eight years old, and still subject to prolonged headaches, the attacks changed their type. After a few weeks of freedom, one day when going up-stairs she was abruptly aware of being accompanied on her left by a large, black, and very hairy dog. In some alarm she ran into a room and sat down, but still found the dog beside her. Being a woman of courage, she put out her hand to touch it, but could feel nothing, although her ghostly companion was still visible. At this moment severe pain began over the left eye, and the dog was gone. The attacks recurred at intervals, as well as the now ordinary brow-pain, without the dog vision, but the 'dog-headaches,' as she called them, were always the most severe. The visual phenomena left her after some years, but as she went to live abroad I lost sight of her. I should add as a curious detail that nearly always, but not invariably, the dog appeared as she was going up-stairs.

"In the second case the apparition consisted in the appearance of a sister who had long been dead.

"The first time it appeared the patient, who was in the fourth month of lactation, was dressing in front of a mirror when she was suddenly aware of the dead sister standing beside her. The vision was followed by a severe pain in the left eye, lasting for many hours, which ended with an attack of nausea and a great flow of pale urine.

"In the third case, the form of a near relative appeared just before the attack of headache, and faded as the pain increased, but she was left for some days with a strong desire to kill the person whose image she had seen. The patient came of a highly neurotic family. Two brothers died of epilepsy, and two sisters had been insane. The patient afterward had attacks of melancholia, but ultimately made a complete recovery after removal of both ovaries.

"In the fourth case a man of thirty saw a variety of visions, complex figures of brilliant pink or red, multiple red circles in rapid rotation, which apparently came from the distance. Once there appeared a crescent of silver on the wall, suspended from which were numerous heads in profile. Some were strange to him, and some the revival of faces which had long been forgotten. In one attack a red spider appeared which merged into a series of rectangles, revolving in swift motion."

De Schweinitz[1] reports six additional cases of migraine hallucinations of vision which preceded or accompanied the attacks. In one of these patients a large green snake was seen just before the attack. In another, marked visions of animals, always either mice or dogs, were associated with headache. Once in the morning the vision took the form of the water-pitcher in the room, through the handle of which a constant stream of running mice playfully chased each other. Once in church the vision was that of a small black dog, that curled himself at her feet.

The hallucinations of vision in connection with epileptic attacks have been observed by many authors to resemble markedly those described by Mitchell and de Schweinitz. I have recently seen a patient who had some interesting visual phenomena connected with epilepsy:

Mrs. A., aged forty, has three children, and has had three miscarriages. There is no neurotic family history, and she has never been subject to headaches. From the age of nine or ten years she has had attacks in which everything seems far off, or, as she expresses it, "like looking through the large end of an opera-glass." There always appeared in these attacks a face with unpleasant expression, which was very distinct for a time, but gradually faded away. She was not unconscious during the attack, but felt powerless to move or exert herself, and would call to any one in the room to shake her so that she might regain self-control. The attacks continued with greater or less frequency until November, 1889, when she

[1] Neuralgic Headache with Apparitions of Unusual Character. Transactions of the College of Physicians of Philadelphia, vol. ix. p. 175.

[1] University Medical Magazine, May, 1889, p. 450.

had an attack of epilepsy (*grand mal*) in her sleep. Again, in April, she had another attack while driving in her carriage. These are the only attacks of *grand mal* which she knows of having had, and both were preceded by the vision of the unpleasant face.

P. Blocq thinks that ophthalmic migraine should be separated from the other migraines. This variety has pain in the head and visual troubles in the simple form, to which are added at times aphasia and sensory or motor troubles. He reminds us that Charcot has already called attention to the fact that ophthalmic migraine may be prodromic to general paralysis. Therefore, its liability to this serious ending must be borne in mind. Blocq relates three cases of migraine associated with general paralysis, the first of which is a typical one of ophthalmic migraine, reported by Charcot, the second reported by Parinaud, and the third case by himself. In all the cases heretofore described the attacks of migraine had preceded the general paralysis, but in the case reported by Blocq the attacks of migraine accompanied the paresis.

Suckling[1] has reported a case of migraine in a youth of eighteen years, in which the attacks were followed by paralysis of the upper eyelid on the left side, which lasted forty-eight hours. The patient had been subject to attacks of sick-headaches since infancy, and the temporary paralysis of the third nerve had occurred since that time. The paroxysms lasted two days, during which time the patient was confined to bed, and was unable to eat. There was a nasty taste in the mouth, and a copious flow of saliva.

The periodicity of the attacks of migraine has been known for many years. It is spoken of by Liveing,[2] but I can find only one writer besides myself[3] who has observed that the attacks may recur on a certain day of the week. Tissot[4] says that Salius relates the case of an Italian monk who, for three years and seven months, had an attack of violent hemicrania every Monday, the attacks lasting from twenty-eight to thirty hours.

Liveing, who refers to Tissot's case, thinks that an exact periodicity like this is probably due to the diet or engagements of the day preceding the attack. This is undoubtedly the case in many instances, but in some of the cases which I have seen there was nothing done on the day previous to the attack different from that done on any other day of the week. I will relate some examples of cases of this kind which I have seen.

[1] Brain, vol. x. p. 241.

[2] On Megrim or Sick Headache, p. 36. London, 1873.

[3] Pepper's System of Medicine, vol. v. p. 407. Philadelphia, 1886.

[4] Traité des Nerfs, vol. viii. p. 102. Lausanne, 1788.

CASE I.—Miss C. J. H., aged thirty years, teacher. Menstruation regular, painless. From twelve until twenty-two years of age she had attacks of "regular sick-headache." For the past eight years the attacks have been confined to the left side of the head, chiefly in the left brow. The attacks recurred with great regularity and came always either on Monday or Tuesday. The attacks were often brought on by fatigue or by a draught of cold air.

Cannabis indica was given in increasing doses and the patient was greatly relieved. The periodicity of the attacks was broken up and the intervals became from eight to ten weeks.

CASE II.—Mr. A. H. W., aged thirty years, temperate, uses tobacco in moderation. He has a sister who frequently suffers from attacks of headache which come almost always on Sunday.

Mr. W. had sick-headaches in childhood, and when about sixteen years of age began to have attacks in which the pain was confined to one side of the head. They occurred almost every Sunday morning for several years. He usually got up with a dull headache and soon after breakfast had scotomata (red and yellow spots), floating at the upper and external angle of the eye. This was followed by violent pain in one brow or in the occiput. The attack would last eight or ten hours, terminating in vomiting or in a sharp attack of diarrhœa, after which he felt entirely relieved. Occasionally the crisis was accompanied by an exceedingly copious flow of urine. The patient usually rose at about 6.30 A. M., but on Sunday lay in bed until 9. This, and the culmination of a hard week's work, probably induced the headache. For the past two or three years his work has not been so hard and his life has been more regular; he now but seldom has a severe headache (not more than three or four in the course of the year), and his general health has become excellent.

CASE III.—Mr. J. D. F., aged forty-one. Married. A grain merchant.

He has had headaches since he was eight or nine years of age. The attacks were not periodical until five or six years ago when he became actively engaged in business. He then began to have attacks with regularity every Sunday. They usually came on about midday without ocular or other prodromes. The pain was always located in the occipital region and lasted with great severity for five or six hours when vomiting occurred, after which he was relieved of pain.

I gave him cannabis indica and regulated his diet and the attacks were very much relieved in frequency and severity. The Sunday attacks recurred for about nine months. He ascribed the attacks to the result of a week's hard work. As he expressed it himself, on Saturday night he would "unbuckle," feeling that his work was done until Monday. Instead of rising at six, as was his habit, he did not get up until nine on Sunday morning. He now very rarely has attacks and they are not so severe as formerly.

CASE IV.—Mr. J. M. H., aged fifty. Bookkeeper and has close desk-work. Of a nervous tem-

perament. His habits have always been good as to stimulants and he never uses tobacco. He had no headaches in childhood. Twelve years ago, at the age of thirty-eight, after a plain, wholesome dinner, he noticed waves and floating spots before his eyes. These were followed by a severe pain in the head. Since that time he has averaged five attacks in a year. The attacks are very much alike. They are always preceded by scotomata and occasionally there is partial hemianopsia. This is followed by pain over the entire head, which lasts for from twelve to fifteen hours. There is nausea, but no vomiting or crisis of any kind. The attacks almost always occur on Sunday. He rises later on Sunday than on other days, takes a bath about midday, and it is after his bath that he usually has the attack of headache. For some years he has had a permanent scotoma before the eyes. He does not notice it when he is at work, but when he is in a bright light or out of doors the spots are very bright, sometimes irregular in shape with a double outline and always seem to be falling.

CASE V.—A. W., aged thirty-three years. Single. Seamstress. She has suffered from headaches since she was seventeen years of age. For some years her attacks have occurred about once a week and almost always on Sunday.

The attack is usually hemicrania, but the pain is occasionally over both eyes. Sometimes there are intervals of three weeks between the attacks, but on each of the last three Sundays she has had her usual form of headache. When at the seashore or in more robust health she has had less frequent attacks of headache.

CASE VI.—M. C., aged thirty-five. Lady's maid. Both parents are dead. Father died of pneumonia, the mother in confinement. She has one brother and one sister. The brother is healthy. The sister is thirty-eight years of age and has always had violent headaches. For many years the sister had the attack on Sunday. Her occupation and mode of life on that day or the day preceding seemed to have nothing to do with the attacks.

The patient's headaches began with the catamenial period, and have always preceded the menses. About nine years ago she began to have headaches on almost every Sunday. There was no change in her manner of life at this time and for three or four years the attacks came with regularity on this day. Then she began to have them on Saturdays, sometimes for two or three months at a time. At present she does not have the attacks so often. She has been free from headache for as long a time as two or three weeks, but she always has an attack before the menstrual period, and does not remember to have ever gone longer than two months without an attack. She has been abroad two or three times, and then she escaped the attacks of migraine for a long period. Sometimes she wakes with pain in the head. At other times the attack begins later in the day. The pain is always confined to one side of the head, and generally the left side. She has no ocular symptoms except wavy spots like smoke. Occasionally there is vomiting, but not generally. The face and lips are pale during the attack. Her general health is good. Her catamenia are regular and she has no amenorrhœa. Her sleep is excellent and she is not overworked.

Treatment.—The drugs which have attracted the most attention of late are, undoubtedly, antipyrine, phenacetin, and the host of antipyretic and analgesic coal-tar derivatives, which have been introduced in the past few years. White[1] claims to have first used antipyrine in headache. At all events, it has been very universally employed in every variety of head-pain since its analgesic properties became known. T. S. Robertson[2] has used it in 88 cases of migraine; in 54 the action was satifactory in the course of from thirty minutes to two hours, and in 15 cases the administration of other drugs was rendered more effective by the use of the antipyrine. A negative result was obained in the remaining 8 cases. He recommends that 22 grains be taken at the onset, and in case the headache continues an additional dose of the same size. Bokenham[3] has used the remedy in 26 cases with entire success, but instead of using the large doses usually recommended, he gives only 3 or 4 grains, repeating the dose in an hour, if necessary.

Müller[4] has given phenacetin in migraine and various other forms of headache, but has found that large doses, as much as from 2 to 3 drachms, have been needed to produce good results.

Pesce has used[5] antifebrin with advantage in migraine. P. Guttman[6] uses phenacetin in small doses and gets as good results as from the use of antipyrine. The great advantage that phenacetin has over antipyrine is that it is much safer, as it does not depress the heart. During the recent epidemic of "grip" phenacetin proved efficacious in relieving the violent headache associated with that disease.

Rabuske[7] after trying quinine, arsenic, caffeine, antipyrine, electricity, change of climate, etc., was successful in the treatment of a very bad case of long-standing hemicrania by the administration of 8 grains of phenacetin night and morning. The cure was effected after the sixth dose.

Antifebrin has been used quite largely of late. Faust[8] has found this remedy, in doses of ½ to 1 drachm, of great use, the headache being relieved.

A. L. Clark[9] has found that 8 to 10 grains of antifebrin will relieve pain in the head in twenty to thirty minutes. S. Merkel,[10] from an experience of

[1] Annual of the Universal Medical Sciences. 1888, vol. iv. p. 444.
[2] Medical Record, May 7, 1887.
[3] London Practitioner, February, 1888.
[4] Therapeutische Monatschrifte, August, 1888.
[5] Le Bulletin Médical, May 30, 1888.
[6] Deutsche medizinal Zeitung, July 12, 1888.
[7] Ibid., Sept. 13, 1888.
[8] Ibid., June 30, 1887, p. 575.
[9] Chicago Medical Times, Sept. 1888, p. 401.
[10] Munchener med. Wochenschrift, June 12, 1888.

49 cases of migraine and headaches of like nature, considers this a valuable drug. James Little[1] recommends, in the treatment of migraine, that during the intervals between the attacks the following pill be given twice a day:

℞.—Arseniate of sodium . . $\frac{1}{12}$ grain.
Extract of cannabis indica . $\frac{1}{8}$ "
Extract of belladonna . . $\frac{1}{3}$ " —M.

He gives in addition to this 2 grains of valerianate of zinc twice daily. To cut short a paroxysm he gives 20 grains of the salicylate of sodium in a wineglassful of water made effervescent by the addition of a dessertspoonful of the granular citrate of caffeine, a second or third dose to be taken after an interval of two hours.

Nitrate of cytisine (a poisonous alkaloid extracted from the seeds of the cytisus laburnum) has been given by Kräpelin in the angio-paretic form with excellent results in two cases.[2] He gives it hypodermically and was led to use it on account of its power of causing contraction of the bloodvessels. In two cases of the spastic form of migraine in which he used it the symptoms were aggravated.

De Schweinitz and Lewis[3] had a certain amount of success in the treatment of hemicrania with the oil of eucalyptus, and I myself had two or three patients in whom this drug was of marked utility. These authors have lately told me that further investigation has proved that its value is by no means general, although certain cases are relieved by its use. In cases where migraine is associated with the gouty diathesis, treatment of the latter is attended with success as far as relief of the headache is concerned. Haig[4] states that he has relieved many attacks in this form of the disease by giving 20 to 30 drops of dilute nitro-muriatic acid in water, repeated once or twice at intervals of a half hour.

Cannabis indica, which has been given in migraine for many years, still holds a prominent place among the medicinal agents used in its treatment. For myself, I may say that I consider it of more value in the majority of cases of migrainous headache than in any other headache. It must be given for some length of time and the dose should be increased until slight toxic symptoms are felt. We must remember the great variability in the strength of the drug, and be careful to begin with a minimum dose. I have but recently seen a patient who had marked toxic effects from $\frac{1}{4}$ of a grain of the extract. Seguin[5] several years ago pointed out the benefit of cannabis indica in this form of headache and insisted on its long-continued use.

Dr. Richard Green, who first recommended Indian hemp in migraine,[1] has continued to use it with success. He maintains that its effect is not simply palliative, but curative, and that in nearly all cases it gives permanent relief.[2] E. J. Overend[3] believes caffeine to be as complete a specific in migraine as quinine is in malarial fevers. He is himself a victim to the affection. He advises the administration of citrate of caffeine in doses of from 3 to 5 grains as soon as the first indication of an attack is felt, and its hourly repetition until relief is experienced. Electricity is of more or less value and many cases have been greatly helped by galvanism. I have found this means of marked benefit, but have not depended upon it alone in any case. Labbé[4] has cured a severe case of eight years' standing by thirty-four applications of static electricity. A number of other new remedies have been used to a limited extent in this affection. Among them is exalgine, which I found of use in shortening an attack. Ringer has successfully used tincture of nux vomica in drop doses repeated every half hour.

Amongst the latest remedial agents proposed for the cure of migrainous attacks is hypnotism. In a work on the subject by Albert Moll[5] he expresses his belief that either post-hypnotic or auto-hypnotic suggestion may be used to cure this disease.

Most authors now agree as to the prime importance of hygienic measures in connection with any remedy used for the relief of this disease. Removal from care and work, with fresh air, good food, and change of climate will do more to relieve the frequency of the attacks than any drug. In connection with this the rest-treatment of S. Weir Mitchell is of the greatest value, and I have seen many cases of chronic migraine relieved by this means.

[1] Note on the Relief of Migranous Headache. Transactions of the Royal Academy of Medicine in Ireland, Dublin, 1888, vol. vi. p. 55.
[2] Neurolog. Centralblatt, Jan. 1, 1888.
[3] THE MEDICAL NEWS, July 20, 1889.
[4] British Medical Journal, Jan. 12, 1888.
[5] Paper read before Section on Medicine, New York Academy of Medicine, Nov. 20, 1877.

[1] The Practitioner, Nov. 1872.
[2] Ibid., July, 1888.
[3] Pacific Medical Journal, Jan. 1889.
[4] Journal de Médecine de Paris, Nov. 11, 1889.
[5] Der Hypnotismus. Second edition. Berlin, 1890.

STUDIES IN THE ETIOLOGY OF MALARIAL INFECTION AND OF THE HÆMATOZOA OF LAVERAN.[6]

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THE present condition of the search for the *contagium vivum* of malaria is such as to make expedient the collection and recording of even isolated experiences. Proof in regard to the causal relation

[6] Read before the Section of Practice of Medicine, Materia Medica and Physiology of the American Medical Association, May 20, 1890.

of the organisms first described by Laveran is so strong as to be all but convincing, yet there are still certain links to be added to the chain of evidence. In bringing forward some observations of my own I shall omit a detailed account of the investigations of others, presuming that from the works of Councilman, Osler, Sternberg, and James, they are already known to the reader.

The observations to which I wish particularly to call attention are those which deal with the flagellate organisms; but partly to preserve a better order, partly as an additional contribution to the subject, I will give my general experience with the malarial parasites.

The observations here reported were made in Galveston, Texas, and after I had become practically familiar with the parasites while acting as Dr. Osler's laboratory assistant. Malaria is uncommon in Galveston. Only three cases which could have originated on the island have come under observation. The other cases, thirty in all, came from various points of the interior of Texas, whose river "bottoms" have a well-deserved reputation as malaria breeding-places. These cases, with few exceptions, were seen in the hospital. In all of them some of every form of the parasite heretofore described by authors have been found. Most of the cases were seen but once, so that detailed studies could not be made. In 12 cases, however, I was able to make more extensive observations, amounting in all to over 50, in which the blood was examined in one or several preparations for from one-half to four hours.

To supplement this I must add another series of more than thirty cases of fevers of various kinds, including enteric fever, pneumonia, phthisis, septic conditions, etc. Some were suspected cases of malaria, and in them quinine had been used. In none of these were organisms found, nor anything (with an exception to be noted later) resembling them. I have also examined the blood of a large number of persons from the interior, some of whom had had chills, but at the time of examination were well; others of whom, though exposed, had never had ague—and in none did I find organisms, nor did ague occur in them as long as they remained under observation.

It is almost needless to say that in many cases the blood-examination led to important changes in the therapeusis. One of the most striking examples is the following: On February 13, 1890, I examined the blood of a foreign sailor just arrived from a South American port, who had had no chills, and on account of muscular pains was thought to have "grippe." Finding a number of nearly "ripe" plasmodia I diagnosed malaria and predicted a chill, which followed in seven hours. Quinine was given and the patient rapidly recovered without another chill.

In all cases I examined the blood from the finger-tip, at the ordinary temperature. In some cases in addition dried preparations were made and stained, but I had no opportunity of making extensive investigations of that kind. Necessary as such studies are in determining some facts regarding the organisms, fresh preparations are for many reasons more valuable. In all the observations I used a Zeiss one-twelfth homogeneous immersion, ocular iv.

This seems the proper place to explain the above statement regarding the bodies resembling the plasmodia, but found in non-malarial blood. The exception alluded to concerns the unpigmented hyaline forms, which are sometimes simulated by certain appearances in the red blood-corpuscles. Some of these appearances are the so-called vacuoles; others, and more deceptive, are reflections caused by bosses on the surfaces of the corpuscles; still others, often seen in patients with hyperpyrexia, are caused by an increase in the biconcavity of the disks. All of these can be distinguished, with care and experience, from the true plasmodium.

For purposes of description the various forms may be classified into endoglobular bodies,[1] including the rosettes; free bodies, including flagellates and crescents. I shall follow this order as well as circumstances allow me.

With the bodies in the first class my experience has been similar to that of others. That is, I have found them in all cases of acute intermittent fever (not cinchonized) and in many protracted cases, and therefore look on them, on the whole, as the most important from a clinical standpoint. I have made several attempts to follow up Golgi's theory of the cyclical development of the plasmodium, the general truth of which is accepted by many observers. My own studies seem to prove the truth of Golgi's law, the practical importance of which is seen in the case cited; but most of my cases have been of mixed type and could not be left to their natural course long enough to establish the relations. I have not yet seen a case of quartan fever, and as all the many rosettes I have observed correspond with those Golgi has described as peculiar to tertian fever, this may be looked on as additional confirmation of his views.

In addition to those forms which perform the cyclical development, terminating in the segmentation of the rosettes, there are other endoglobular bodies which have a different series of phases. Many of these forms have been seen and described by various authors. Celli and Guarnieri looked on them as irregularly segmenting forms, and possibly

[1] Plasmodium malaria of Marchiafava and Celli.

as degenerations. Golgi described a very common form as a modification of division, but was uncertain whether it really was so. I have had very favorable opportunities for studying these bodies, and can confirm the observations of the authors named, as well as carry them further in some respects.

For convenience I shall speak of them as atypical plasmodia. They differ so much in minute details, that it is difficult to classify them, and indeed it would probably not be profitable to do so, since the differences can hardly be important. I have studied these bodies carefully in six cases, and have seen them in several others. Four were cases of acute vernal intermittent. In the two other cases there had been no chills for one month, but the temperature rose from one to three degrees at irregular periods. ("Dumb-ague," "bone-fever," of common parlance.) In the former cases there were typical forms, in the latter none.

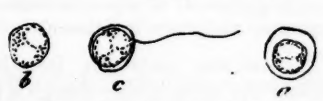
These atypical bodies develop from small hyaline forms which cannot be distinguished from the typical plasmodia. The process of development is rather rapid, and is apparently unconnected with the course of the fever. They seem to have a special tendency to escape from the blood-corpuscles at early periods (Fig. 1). A little later than the

FIG. 1.

Changes of form in a small, free, hyaline body. Observation lasting five minutes.

stage shown in the figure, but where the corpuscle is not entirely destroyed, they form, on escaping, small spherical bodies, single or in rows connected by fine filaments, which have a fibrinous appearance. When the bodies reach a size almost equal to that of the corpuscle, they begin to assume the characteristic forms which distinguish them from the developing rosettes. That is, the pigment remains scattered, or, more frequently, fills a narrow zone near the edge, or outlines one, two, or three clear spaces in which dark globules can be seen. (Fig. 2, *a*, *c*.)

FIG. 2.



Developing atypical plasmodia. Nuclear bodies not shown.

The later stages of this process are not often seen in blood from the finger, which fact makes me think that part of the development of these bodies is in internal organs. This opinion is supported by the analogous development of the rosettes in the brain-capillaries in pernicious malarial fever; and I have seen the stage often enough to know that the substance of the corpuscle is gradually destroyed, a shell-like, colorless rim being left for some time, but ultimately disappearing. (Fig. 2, *b*.) Even before the final disappearance of the corpuscle a filament may form on the plasmodium (Fig. 2, *c*.), as I have seen in one observation. We thus have the free pigmented bodies, which, though varying in details, correspond in general to the later forms of the atypical endoglobular forms.

As my observations show a relation between these and the flagellate organisms, I shall consider other of their characteristics in connection with the latter.

Regarding the nature and origin of the flagellate bodies there still exist the greatest differences of opinion among authors. Laveran, in his earliest as in his latest communication, described them as the most characteristic and most important forms of the parasite of malaria, but admitted that they are comparatively seldom seen (in 92 out of 432 cases), as they appear only in a certain stage of development. Councilman came to similar conclusions, and found the bodies in 15 out of 20 cases in which splenic blood was examined. On the whole, the mass of testimony is against these views. Space does not permit a review of all that has been written on the subject recently, and I shall submit my own observations with only occasional reference to the contradictory or confirmatory studies of others.

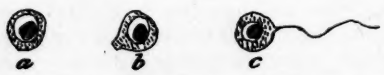
In regard to the occurrence of the flagellate bodies I can say from my own earlier experience that they were often overlooked because the bodies on which they form were mistaken for pigmented leucocytes. It is remarkable how cautious in this respect were the older observers of malarial blood (Virchow, Frerichs, and J. F. Meigs), and how near some of them came to anticipating Laveran's discovery (Kelsch and Joseph Jones).

The occurrence of flagellate bodies in three successive cases of acute intermittent seen this spring led me to look over my notes, and I was surprised to find how frequent flagellate bodies had been observed in my experience. Of the 12 cases carefully observed, in 7 acute cases they were found six times, and in 5 chronic cases twice or probably three times. The description of the bodies which follows is based on observations made in 4 cases of vernal intermittent, of from three days to one week's duration.

Corresponding to the stage at which they escape from the corpuscles (or are formed by budding, as described below), the free bodies vary in diameter from one-fourth of to quite that of a red blood-corpuscle. A large majority are slightly smaller than the latter. At rest, and when fresh, they are round, with positive but faint outlines, and always contain black or reddish-brown pigment, in short rods. The

pigment is usually gathered in a zone near the margin, the centre being clear and very bright and containing a dark globular body (nucleus?), as seen in Fig. 3. In some the nucleus is divided, or in dumb-

FIG. 3.



Flagellate body. The changes shown were observed within a period of ten minutes.

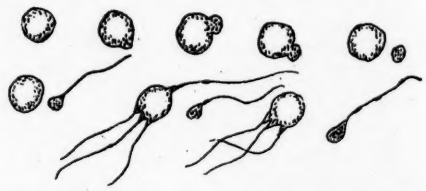
bell shape, or there are two or three clear spaces with pigment around them, as in the endoglobular forms (Fig. 2). In others the pigment is scattered over the optical surface, and in such it may be seen by focussing that the body is spherical, or spheroidal. In most of the bodies the pigment exhibits, at once, or soon after the preparation of a specimen, a peculiar motion. This was accurately described by Laveran, and quoted by Sternberg, but not mentioned, so far as I know, by other observers, who speak of the motion as "Brownian." Celli and Guarnieri have described a similar motion in bodies derived from crescentic forms.[1] Laveran's words are very vivid: "*Les grains pigmentés . . . . . sont animés de mouvements très vifs, comparables à ceux des particules solides qui se trouveraient dans un liquide en ébullition.*" That the motion is not Brownian may be seen by comparing the melanin granules in the bodies with others free in the plasma. It seems to depend on currents or contractions in the protoplasm of the bodies. The outlines of the bodies appear almost structureless, but at times the edges show an active undulation, when a membrane is apparently present. The undulation of the margin seems to be connected in some way with the formation of the filaments, and I have often been struck by the aptness of the comparison Richard drew between the process observed and the struggles of an animal. The edge waves violently, small projections are formed, pigment grains are ejected, and finally, in the words of Laveran, the filament shoots out. It may be apparently retracted again, but at last rhythmically oscillates or lashes to a length of twenty to thirty micromillimetres. Not all the filaments make so much commotion on their first appearance. Sometimes they appear on a side where there was little motion. It is usually said that filaments are never seen until from fifteen to twenty minutes after the preparation of a slide, but some observers have seen them earlier without a warm stage, and I have "focussed down" on a body with active filaments, with a surrounding temperature of 80° Fahr. Frequently I have seen the whole process end within fifteen minutes. The delicate structure of the filaments cannot easily be portrayed. They taper off rather abruptly from the bodies. Terminal knobs I have never seen, except those caused by pigment granules, but dilatations on the filaments have been rather frequent, and were always caused by movable pigment. In some cases the filaments appear to be tubular, as described by Laveran. I have often seen, as have others, the filaments, with or without pigment grains in them, tearing loose from the bodies, when they can be seen moving in a not very active manner, but often making wide excursions.

The production of filaments is not the only capability of the free bodies. Frequently a process of budding may be seen, the daughter-cells so formed having also a filament and dancing pigment.[1] I could trace no connection between the budding and the nuclear globules described.

In order to make clearer the characteristics of the bodies under consideration I reproduce sketches and notes made on a single one, in an observation lasting half an hour:

Fig. 4. Large round pigmented body; pigment marginal; edges undulating; intense motion of pig-

FIG. 4.



ment on side opposite eccentric nucleus (not shown in sketch); formation of a bud, in which pigment is intensely aggregated and dancing. The portion of the bud on the wall varies as much as 40 degrees; bud gradually constricted off; a filament four times as long as a red corpuscle formed on daughter-cell; mother continues undulating and pigment motion (the melanin rods) having an excursion of 20 degrees to 40 degrees around the periphery. Three filaments appear on mother-cell; opposite them a very long filament appears, strongly agitating adjacent blood corpuscles; daughter-cell approaches and indents a red corpuscle repeatedly, but does not enter it. Daughter-cell is larger, pear-shaped, pigment running up and down in filament.

When preparations containing free (flagellate) bodies are kept for some hours—though a half-hour may suffice—their dissolution may be seen. The edges become more vague, the body flattens out and

[1] Canalis mentions it in a recent work received after this paper was finished. Fortschritte der Med., 1890, No. 8,

[1] Celli and Guarnieri (loc. cit. p. 528) describe the formation of flagellate daughter-cells from atypical segmenting bodies, but do not mention the formation of filaments on the mother-cell. I have recently seen both, in bodies which correspond in other respects with those described by the authors.

finally remains as a shapeless, hyaline mass, with motionless pigment-granules scattered over it.

As already intimated, what I have said of the flagellate bodies is based on observations in the early stage of intermittent fever. Bodies similar in every respect, and accompanied with typical endoglobular forms and crescents, have been seen in protracted cases of severe intermittent; also in cases in which malarial infection could not easily be recognized without the microscope. In the latter they were the only forms, as in the following case:

M. R., laborer, living in the western part of Galveston, a swampy region. Admitted April 14, 1890, for diarrhœa. Had three chills six weeks ago, with intervals of one day. Took "Chill-cure." No more chills, but is peevish at times; spleen enlarged. In the blood numerous large, endoglobular, atypical bodies are found, together with many free bodies and flagellates. Kept on spirit of Mindererus for four days. The temperature rose to 99.8° F. from 2 to 4 o'clock P. M. daily. Patient expressed himself as feeling well. The bodies persisted as before; there were no typical forms. The diarrhœa having ceased spontaneously the patient left the hospital.

In a case of two months' duration seen last fall, which began as tertian but became quotidian, I found numerous free and flagellate bodies and crescents, but no endoglobular forms. The patient had been cinchonized for some time. Tonic treatment, with small doses of quinine, was carried out. There were no more chills. Flagellate bodies, and later the crescents, ceased to appear.

Other histories could be cited, but I think enough has been said to show not only the number, but the variety of cases in which the flagellate bodies occur, confirming in the latter respect what Councilman has said of the bodies.

As regards numbers, the flagellate bodies and free pigmented bodies seem to vary more in different cases than in the same case at different times (except under treatment). In some cases one only may be seen in a preparation. In one case every field had at least one, sometimes two or three. At times one can see a medium-size pair together. Not all of these free bodies had filaments, but some filaments could always be found, and no doubt many were overlooked in the brief time of the examination.

As to the origin of the bodies, my observations show beyond doubt that they are derived from certain endoglobular forms. From their occurrence in recent cases it would seem that they are simply varieties of the forms which carry on the typical process in malaria. But on the other hand, cases like the two described make it probable that they have an independent existence. To make this supposition stronger we must discover the unknown parts of the cycle of development—*i. e.*, the origin of the atypical endoglobular forms from the free bodies—as has been done for the typical bodies. In the first case here described I saw the nucleus of a free body break up into a number of oval globules, smaller than those of the tertian cyclical forms, but could not see their ultimate liberation. The most inviting solution of the question may possibly be found in the theory of Celli and Guarnieri[1] that the plasmodia can go into the reproductive phase at any stage of their development. It has occurred to me that perhaps the atypical and flagellate bodies are the results of such processes, and that they represent resting states of the organism, capable of existing independently, perhaps even of reproducing themselves, but also able, under favorable circumstances, of reproducing the typical growth of the parasite. Biology supports such a theory as much, I believe, as it does the theories which make them simply degenerative or post-mortem phenomena. In endeavoring to get some light on this question I thought of the action of drugs as perhaps giving some assistance. The effect of quinine on the parasites has long been known; *i. e.*, that it stops the development of the plasmodium, but has no effect on the crescentic bodies. In all the reports I have access to, large doses of quinine have been used. I endeavored to make the process less abrupt in the following case:

J. H. Acute quotidian intermittent; second chill. In the blood, developing plasmodia (rosettes) and flagellate bodies were found. He was given tincture of gentian for two days, the chills and condition of the blood continuing. Five grains of quinine given in solution three hours before the next expected chill prevented the paroxysm, but the blood contained bodies as before. That is, there were large, "ripe" plasmodia and free bodies with very active filaments. No rosettes. On the next day, after thirty-five grains of quinine had been given, the endoglobular forms were fewer, but the flagellates numerous and active. On the following day, with twenty grains of quinine, endoglobular bodies were not to be found, and of the few free bodies all were motionless, as was their pigment, and they developed no flagella. The patient was discharged at his own request and has not since reported.

In another case I tried a remedy which may prove a valuable addition to our list, viz.: nitrate of potassium, recommended by Dr. J. D. Hunter.[2] After my friend Dr. Hadra had told me of his success with this remedy in ague, I tried it, but, in order to observe the blood-changes more readily, gave it, not as advised by Hunter, in

[1] Loc. cit., p. 527.

[2] Virginia Medical Monthly, February, 1890.

large doses before and during the paroxysm, but in smaller doses, fifteen grains every three hours. The case was one of quotidian (double tertian) intermittent, of one week's duration, and had been treated by whiskey alone. I may add that the effect of saltpetre on a *potator's* stomach was much better than that of quinine. After beginning treatment there were no more chills, but the temperature rose on two successive days to 101.2° and 101.8° F. respectively. The manner of disappearance of the parasites was precisely similar to that in the other case; but as the patient was kept under observation ten days after the last chill the final and complete disappearance of the flagellate bodies could be followed.

In a third case quinine and saltpetre were used together, as follows: At the beginning of a chill (the second of a tertian) the patient took ten grains of quinine in capsules. The temperature rose to 100° F. Examined in the defervescence the blood showed organisms, endoglobular, free and flagellate. Saltpetre was given in the dose of thirty grains every three hours and the parasites disappeared in the same order as in the preceding cases.

These observations show a greater resistance to specific or antiperiodic remedies on the part of the flagellate bodies, and support the view I have advanced as to their nature—*i. e.*, as resting forms. A temporary cessation of intermittent fever prevents me from carrying these observations further, so that for confirmation as well as for learning additional details regarding the atypical bodies we must await future investigations. It is in the hope that others may take up the matter that I bring forward these few observations.

My observations on the crescentic bodies, though rather numerous, are all imperfect from the fact that I could not observe my cases in their natural condition for a long enough period. Observers are unanimous in considering these bodies the constant parasites of the chronic irregular forms of malaria, and of malarial cachexia, but as to their origin and development and relation to the other forms there is still great difference of opinion. Most recent investigators ascribe to these bodies an endoglobular development, but the accounts of various authors differ radically. Golgi, who looks on the endoglobular origin as undemonstrated thinks they represent a later stage in the development of the flagellate bodies. I have not yet seen his latest contribution on the subject.

I have never seen a crescent in a red blood-corpuscle, although in some of my cases crescents were so numerous that six or seven could be seen in a single field. Still, I am inclined to believe in the endoglobular development of these forms, on account of the numbers in which they occur, the destruction of blood corpuscles in those cases, and the difficulty of accounting in any other way for the melanin they contain. The most interesting explanation of the origin of the crescents is that suggested by Grassi and Feletti (p. 434), viz., that it takes place in the bone-marrow. This explains why undeveloped crescents are so seldom found in blood from the finger, and receives support from observations of Danilewsky on certain parasites of reptiles, probably belonging to the same class as those of malaria.

Crescentic bodies are seldom found in recent cases. The following history shows the most rapid development I have yet seen.

October, 1889, a man who had never before had malaria lived for four weeks in one of the most noted ague localities in Texas. A week after his arrival a quotidian intermittent became manifest and soon the paroxysms were doubled, one in the day and one at night. Quinine was taken to cinchonization during the first week; after that not at all. Examined three weeks after the first chill. His blood then showed many crescents, but no endoglobular or flagellate forms. The blood corpuscles numbered 2,335,000 per c.mm.

Under the energetic use of quinine, arsenic, strychnine and iron there was steady improvement and there were no more chills. Crescents gradually disappeared.

The changes the crescents undergo have often been described and need not be repeated here. That they are cadaveric I have no doubt. The production of filaments on them, however, I have never seen, although I have looked for it long and frequently. In all cases where filamentous bodies were found with crescents, the flagella could be seen to develop only on the bodies already described.

A word in regard to an important subject, namely phagocytosis. I have endeavored to study this in malarial blood, but the results were disappointing. I have often seen the atypical bodies enclosed, while still active, in leucocytes (large polynuclear and eosinophile), and have followed their gradual disintegration. But considering the number of free bodies and leucocytes encountered, the process, on the whole, is infrequent, and "pigmented leucocytes" do not figure so largely in our notes on malarial blood as before the parasites were known (James, p. 270).

As said at the outset, it is not the object of this paper to consider the whole aspect of the pathology of malaria, and I have purposely avoided discussing the biological and etiological relations of the malarial parasite.

As to the former I can add nothing to the latest conclusions of those who have given most thought to the subject. The lowest classes of animal organisms, to which the hæmatozoa malariæ are evidently related, are so imperfectly understood that at present

we learn but little from them. The investigation of malarial blood by biologists with special training must throw a great deal of light on that subject. Though culture methods and ordinary inoculations are not available much can be done, with no danger and but slight discomfort, by inoculations in man.

As regards etiology, while the strict methods of bacteriology cannot be applied to malaria, proof as to the causal relation is stronger, it may be remarked, than it is for some parasites whose pathogenic nature is not questioned, *e. g.*, the trichina spiralis. Inoculations by many observers have shown that the virus of malaria exists in and is transmissible by the blood. In the latter we find the organisms, whose cyclical, combined with irregular, polymorphous development furnishes so perfectly what clinical pathology requires of the germ of malaria. Added to this we have the action of quinine, which, specific as it is for some forms of the disease, is so probably only by virtue of its power over amœboid organisms in general.

The value of the organisms in diagnosis has been emphasized by all who have tested the matter. The use of the microscope in clearing up the nature of a host of vague complaints, called by both profession and laity "malarial," and in limiting the application of that term to the proper class of diseases, should be general.

Not only in diagnosis is the microscope of practical value in malarial diseases, for with its assistance specific remedies can be used more rationally than heretofore, and with a certainty not otherwise possible.

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Laveran: Compt. rend., No. 17, 1882; Archiv de Med. Exp. etc., 1889, p. 798, and 1890, p. 1; reference in Fortschritte der Med., Bd. 8, 1890, p. 231.

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CLINICAL MEMORANDA.

SURGICAL.

Mucous Polypi of the Bladder in a Child. Suprapubic Operation. Death on the 23d Day.—The following case is reported somewhat in detail; first, because cases of vesical tumor are by no means common; and, second, that it may add to the data available in forming a prognosis in such cases, although some doubt as to the exact cause of death makes the case one of uncertain value in determining the prognosis of future operations.

The case is as follows: March 11, 1890, I saw for the first time R. B., aged four and a half years. The boy was considerably emaciated, but there was no satisfactory evidence of any disease other than that of the bladder. The symptoms dated back eight months, and had been gradually increasing in severity. At the date above mentioned, there was frequent micturition, with much vesical tenesmus and pain; some dribbling of urine (urine was never bloody); prepuce elongated from frequent handling. Micturition was distinctly easier when the body was in a horizontal position. Microscopical examination of urine revealed nothing more than evidences of cystitis. There were the ordinary symptoms of stone, but with more than the ordinary amount of pain and tenesmus. The boy was accordingly examined for stone on two different days and under chloroform; the instruments used were a small, ordinary urethral sound, and a small, flexible, metallic olive-tipped urethral bougie. The results of these examinations were not satisfactory. With a finger in the rectum, the bladder felt thick and boggy even after the urine had been drawn off by a catheter. The sound could be felt through the base of the bladder, and once upon entering there was a faint suspicion of a "click." At another place there was a suspicion of a grating sensation that was also suggestive of a calculus. These suspicions, however, did not warrant a cutting operation—certainly not cutting for *stone*. The only fact that might have been suggestive of the true condition of affairs was that the amount of urine that could be drawn off with a catheter did not correspond with the suprapubic percussion dulness, which persisted in a considerable degree after withdrawal of the urine. Another fact already mentioned, and particularly noticed by but one of several authorities consulted upon the subject, was the *inordinate* vesical tenesmus. Although no blood appeared during or after the two examinations referred to, the pain and tenesmus were increased thereby, and an operation was decided upon as the best means of curing the cystitis and relieving the tenesmus.

A suprapubic cystotomy was therefore made under some disadvantages. Owing to circumstances beyond the control of the operator, the child could not be moved to a hospital; the house was small and the surroundings decidedly unattractive from a surgeon's point of view. No rectal distention was used, the bladder being moderately distended and irrigated at the same time by a stream of warm, boiled water from a fountain syringe at an elevation of three feet above the bladder. A median incision two inches long and just above the symphysis gave access to the bladder-wall, which was incised between two supporting tenacula. The peritoneum was not seen. The incision was made large enough to admit a finger, and the bladder was found completely filled with pedunculated mucous polypi varying in size from one-eighth to one inch in diameter and variously attached to the base of the bladder, but grouped more closely about the vesical neck. These were carefully removed with the finger-nail and forceps, and when removed half filled a one-ounce quinine bottle. The hæmorrhage

was unimportant. The bladder-wall was not sutured. Two or three deep sutures closed the abdominal wound about a Trendelenburg drainage-tube—no perineal drainage, or catheter in the urethra. The pain and tenesmus were entirely relieved by the operation, and the child's general condition seemed much improved. The wound was dressed daily, and the drainage-tube removed on the sixth day. The temperature was normal until the seventeenth day, when there was slight fever and some looseness of the bowels. The wound looked healthy, and the cause of the disturbance evidently was one or two recent errors in the management of his diet. On the eighteenth day there were two general convulsions, with loss of consciousness, lasting two or three minutes; looseness of the bowels continued, with pronounced though not excessive tympanites. On the two following days there was some general improvement. There were no more convulsions and no higher temperature, but on the twenty-third day the patient died with no more marked symptoms than those above described.

W. A. BATCHELOR, M.D.

MILWAUKEE, WIS.

OBSTETRICAL.

A Case of Placenta Prævia; Death.—The following case is that of an Italian woman aged thirty-four, who had had three children, all of which are living. The labors were easy. To this case my friend Dr. Cheston, of Chestnut Hill, called me in. The woman, according to our informant, had been bleeding so profusely for fifteen hours that the bedclothes and surroundings were soaked. On arrival we found a very pale, though fairly well-nourished woman. Her pulse was weak, and respiration hurried. She was not bleeding at this time. We were informed that she was in the seventh month of pregnancy. On vaginal examination the os was found the size of a half-dollar, and on introducing the examining finger, all antiseptic precautions being carefully observed, the placenta was found firmly adherent around and across the os, and bleeding when touched. The woman being very weak from the excessive loss of blood, and not bleeding at this time, version and delivery were delayed. As she had some bearing-down pains, one drachm of ergot every two hours was ordered, and the vagina was tamponed.

The foot of the bed was raised. Hot black coffee, and half an ounce of whiskey with tincture of digitalis were given also, every two hours.

In the evening, about eight hours later, we found her bleeding, but in a somewhat better condition. Having been allowed to get up out of bed to bear down, she had forced out the tampon. She had vomited her ergot and stimulants.

We decided to perform version and delivery by the breech. External version was done, the os still about the size of a half-dollar, and the feet were brought down. The woman was given her coffee and milk, and hypodermic stimulation was resorted to, but the pulse was failing. The breech being delivered, the arms were extracted, but great difficulty was experienced in delivering the head, and after some effort the forceps were applied. After the child was delivered the uterus commenced to contract under the action of external abdominal stimulation. The placenta was apparently normal. The child, rather large, was born dead. The mother never reacted from the profound collapse, and died an hour after labor.

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MEDICAL PROGRESS.

Treatment of Granular Lids with Strong Solutions of Bichloride of Mercury.—In the *University Medical Magazine* for July, 1890, is the following report from the hospital service of DR. G. E. DE SCHWEINITZ:

The favorable reports which from time to time have appeared in regard to the value of strong solutions of bichloride of mercury in the treatment of granular lids have led to an extensive trial of this remedy in the eye wards of the Philadelphia Hospital. The method adopted is as follows: Every alternate day the everted lids are carefully touched with a solution of bichloride of mercury, 1 : 300 or 1 : 120, according to the size of the granulations, while three times a day the conjunctival cul-de-sac is irrigated with a warm solution of the same drug, 1 : 7000. No other medicine is employed. The results have been almost uniformly favorable. In no single instance has the disease been aggravated; in a few it has apparently undergone no modification, while in the vast majority, after four or five applications of the character described, there has been increased comfort, lessening in the size of the granulations, dissipation of the discharge, and not infrequently amelioration of pannus, if this was present. Perhaps the strongest testimony in favor of this application is that given by most of the patients themselves, all of the chronic cases having, either in this institution or elsewhere, had all manner of local astringents applied to their everted lids. Their testimony is practically unanimous that this has given the greatest comfort. It is a painful application, and in sensitive patients, as has been recommended, the eyes may be cocainized. In most of the instances, however, this precaution has not been deemed necessary. These observations are based upon the experience of about thirty cases.

The Pathogenesis of Yellow Fever.—DRS. FINLAY and DELGADO (*Lancet*, June 21, 1890), who have for some time been engaged in investigating the bacteriology and pathology of yellow fever in Cuba, recently read a paper on the subject before the Havana Academy of Sciences, in which they detailed their experiments and discussed their significance, with special reference to the researches of Dr. Sternberg. They say that Sternberg's micrococcus Finlayensis has been found by Dr. Kinyoun on the skin of patients suffering from malarial fever in localities where yellow fever does not occur, and that it is, therefore, impossible that this microörganism can bear any relation whatever to the causation of yellow fever. The micrococcus tetragenus versatilis has been found in the serous fluid of blisters on yellow fever patients in spite of the most careful disinfection of the skin, in one-half of the cases examined, and in three-eighths of the specimens on which observations were made. This micrococcus was found in the blister serum of persons resident in Havana and acclimatized, in two out of seven cases examined, and in three-thirteenths of the speci-

mens taken, but only in cases where the disinfection of the skin had been omitted, or in which it had been but imperfectly performed. Nothing of the sort was found in any of the eight specimens taken from four persons whose skin had been as thoroughly disinfected as that of the cases of yellow fever.

The Dangers of Tonsillotomy.—Removal of the tonsils by the bistoury or guillotine is a popular operation in England and America. The French are less partial to it, and MM. Quénu and Lucas-Championnière have recently dwelt on its dangers at the Paris Société de Chirurgie. The latter surgeon referred to two cases in Broca's practice where profuse hæmorrhage followed removal of the tonsils. In one of these instances the patient, a medical student, died almost immediately after one tonsil was cut, so violent and uncontrollable was the bleeding. In a case in M. Lucas-Championnière's own experience the patient, a middle-aged man, had enlarged tonsils, quite free from inflammation, and he was not suffering from any morbid condition likely to prevent the natural arrest of hæmorrhage. On removal of one tonsil hæmorrhage took place, and could not be checked until after two hours of digital pressure with a tampon soaked in ergotine. M. Quénu always uses the galvano-cautery three or four times, at intervals of a fortnight, and atrophy of the tonsil always follows. MM. Marc Sée and Chauvel do not dread the knife. There can be no doubt that hypertrophy of the tonsils require active treatment, especially in youth; and the evil consequences of neglect are well known. In the majority of cases the risk of dangerous hæmorrhage is very slight; but the possibility of its occurrence should always be borne in mind, and the use of ice or of a styptic gargle should be enforced as a measure or precaution immediately after the operation. —*British Medical Journal*, June 21, 1890.

Prescription for Exophthalmic Goitre.—According to the *Weekly Medical Review*, DR. A. F. WATKINS recommends the following prescription in the treatment of exophthalmic goitre:

℞.—Picrotoxin . . . . $\frac{1}{30}$ grain.
Aqueous extract of ergot . $2\frac{1}{2}$ grains.

Make into a pill. One pill should be taken three times daily.

Aseptic Wound Treatment.—BLOCH, of Norway, deprecates the use of corrosive sublimate as an antiseptic in surgical practice, and believes that with proper precautions as good results can be obtained without this agent as with it. The author's usual method of procedure is as follows: The region to be operated on is cleansed with soap and water, ether, and carbolized water (3 per cent.); the instruments are sterilized by exposure to steam, and then laid in carbolic solution (3 per cent.). At the end of the operation the wound is irrigated with carbolic solution of the same strength (sometimes it is first swabbed with chloride of zinc, 10 per cent.); all ligatures and sutures are of catgut, prepared by steeping first for forty-eight hours in 5 per cent. watery, then in 5 per cent. alcoholic, solution of carbolic acid. The author has discarded Schede's sublimated catgut, culture experiments having shown it to be not invariably sterile. Drainage-tubes (red rubber) are kept in 3 per cent. carbolic solution. Two layers of sterilized gauze are interposed between the absorbent dressing and the wound to keep the cotton-wool from sticking to the stitches. The drainage-tubes are removed on the third, fourth, or fifth day, and the dressing then applied remains on for two or three weeks.

After summing up the results of twenty-nine cases managed in this manner, the author is able to say that wounds treated with sterilized cotton-wool heal in an ideal manner. Nevertheless, on examining the secretions of the wounds, as was done in every case, there were found microbes even in the "aseptic" clots from the drainage-tubes withdrawn on the third, fourth, and fifth days. None the less he is able to record perfect union, by first intention, without any suppuration whatever.

The microbes found were monococci, diplococci, and staphylococci. Cultures usually showed these to be staphylococcus albus; rarely staphylococcus pyogenes aureus or bacilli were found.

Cases treated with a layer of iodoform gauze next the wound give equally good results. Here, too, there were microbes in the clots; from one case, which healed ideally, there was obtained the staphylococcus pyogenes aureus.

With carbolized gauze next the wound the results were the same: the wounds healed in perfect manner, but microbes were present. In only two out of seventeen cases could they not be found. They probably lodge in the epidermis, and are practically ineradicable from it; and it must be supposed that their development is inhibited by the antiseptics applied to the wound during and after the operation.

Conclusions.—1. Large operation wounds may heal as perfectly, in a clinical sense, when dressed with sterilized materials not containing any antiseptic agents as when treated with antiseptic dressings.

2. Large aseptic operation wounds, dressed simply with sterilized cotton-wool, heal generally by first intention.

3. The secretions of wounds, healing without any suppuration whatever, contain microbes, as a rule, whether the dressing contains bactericide agents, or consists simply of sterilized materials.

4. Wounds containing microbes (abscesses, etc.), dressed simply with sterilized cotton-wool, may pursue a course identical with that which they would have pursued had they been treated with antiseptic dressings.

The logical issue of the investigation would be the recommendation of sterilized cotton-wool as the best form of dressing. For private operations, where two intelligent persons can divide the work between them, it is available with full security. But in large hospitals, where the carrying out of details is divided among a number of persons, a certain security is gained by the addition of an antiseptic agent.

For this reason the author recommends the treatment of wounds by carbolic acid, with the modification that the outer layer of the dressing shall be not of macintosh, but of sterilized non-absorbent cotton-wool.—*Glasgow Medical Journal*, June, 1890.

The Dangers of Constipation in Children.—In a lecture recently delivered before the Paris Hospital for Sick

Children, DR. JULES SIMON (*Journal de Médecine et de Chirurgie*, May, 1890) called attention to the fact that while diarrhœa occurring in children is the object of the most extreme solicitude both on the part of parents and of physicians, constipation, which possesses almost as great danger, is almost entirely neglected. He called attention to the case of a girl, fifteen years of age, who was brought into the hospital suffering from extreme abdominal pain, caused by a fall upon the abdomen, and followed by an abscess in the abdominal walls. The symptoms, however, rapidly increased in intensity, and were followed by vomiting and diarrhœa, and the patient died at the end of a few days. At the autopsy there was noted general peritonitis, with a perforation of the cæcum, surrounded by an old purulent deposit in this region. There was thus typhlitis, followed by perforation, which led to the formation of an encysted abscess in the pelvis, and only as the result of injury was general peritonitis produced. Dr. Simon believes, from the nature of the lesion observed, that the inflammation and the perforation were the consequences of marked constipation, leading to a rapidly fatal termination by traumatism. He believes that cases similar to the one reported are much more common than is ordinarily supposed, and he thinks that in many cases faulty development and numerous digestive disturbances are attributable to more or less obstinate constipation. Indeed, even in some cases death itself may follow either through the production of typhlitis and the perforation of the cæcum, as in the present case, or from intestinal obstruction. Dr. Simon stated that in another case he had seen death produced by a fæcal tumor the size of a child's head. In such cases the author has frequently obtained satisfactory results from electricity, but when the obstruction has been overcome by this means, it must be recognized that the patients are constantly exposed to a return of a similar state of affairs; for the intestinal tube, after such great distention, becomes the seat of structural modifications, and is almost incapable of resuming its normal condition. There is thus a practical point to be observed, whose neglect may be followed by the most serious complications, and in examination for the cause of obscure infantile troubles the occurrence of constipation as a possible factor should never be overlooked, especially as constipation may be actually obscured by an apparent diarrhœa.—*Therapeutic Gazette*, June, 1890.

Condensed Milk as an Infant-food.—DR. LOUIS STARR considers condensed milk a good food for infants while travelling, or under circumstances in which good cow's milk cannot be procured. If possible, he gives it in the following mixture:

Cream	1 tablespoonful.
Condensed milk . .	2 tablespoonfuls.
Water	11 "
Mellin's food . . .	1 tablespoonful.

In preparing this, the water should be heated to the boiling point, adding first the Mellin's food, then the condensed milk, stirring constantly until the solution is complete. After the mixture has slightly cooled, the cream is added. This amount is sufficient for one meal for a child of eight months.—*Annals of Gynæcology and Pædiatry*, June, 1890.

Ointment for Chapped Hands.—According to the *Journal of Cutaneous and Genito-urinary Diseases*, the following is an excellent application for chapped hands: Dissolve one part of boric acid in twenty-four parts of glycerin; add to this solution five parts of anhydrous lanolin and seventy parts of vaseline. The mixture may be colored and perfumed.

A Plaster-of-Paris Splint for the Treatment of Fractures of the Leg.—DR. A. G. R. FOULERTON describes the following method of applying plaster dressings to fractures of the leg (*Lancet*, June 28, 1890):

In the case of a fracture, say, at the junction of the middle and lowest thirds of the leg, three measurements are taken: (1) The length of the limb from a point an inch and a half above the knee to the sole of the foot; (2) the circumference of the thigh at the level of about an inch and a half above the knee; (3) the length of the foot from the heel to the ball of the big toe. An oblong piece of shrunken flannel or old blanket is then cut to such dimensions that it is in one direction an inch and a quarter longer than measurement 1, in the other an inch and a half less than twice the measurement 2. The limb is laid on the flannel, which is then held up by its edges, supporting the leg as in a sling. Next, the flannel is tacked together with needle and thread close to the limb, down the front of the leg, along the sole, and then along the dorsum of the foot. It is better to sew the flannel in the order given, along the sole first and along the dorsum afterward, because by doing so the foot will be held by the flannel in the position in which it should be—at a right angle with the axis of the limb. The leg is thus closely encased in flannel, while along the front of the leg and the dorsum and sole of the foot a double free edge of flannel is left beyond the seam. These free edges along the dorsum of the foot, as high as the ankle, and along the sole, are trimmed off close to the seam. There now remain two considerable wings of flannel extending down the front of the leg as far as the ankle. Each wing, when turned back from the middle line in front, will reach to within about half an inch of the middle line behind. These wings are then trimmed from below upward, so as to shape them to the form of the leg. Two side splints with rectangular foot-pieces are then cut out of flannel, so that each piece, when applied to the limb, shall reach to within about a quarter of an inch of the middle lines in front and behind. Care must be taken that the anterior edge of each side-piece is quite straight; the posterior edge may be shaped so as to allow for the swelling of the calf muscles. Traction is then applied to the limb, and these side-pieces, having been thoroughly saturated with plaster-of-Paris mixture, are placed over the flannel casing, one on each side of the leg. The wings of flannel are then quickly folded back, each over its respective side-piece, and smoothed down. Plaster-of-Paris is then rubbed well into the outer surface of the two flannel wings, avoiding, however, a border about a quarter of an inch wide down the front of the leg on either side of the seam. The perfect adaptation of the splint to the limb may then be secured by applying a thin muslin roller-bandage over the whole from the toes upward. After ten minutes the muslin bandage is unrolled, and the splint is then finished. The plaster will probably be quite dry in the course of an hour.

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SATURDAY, JULY 19, 1890.

THE RELATION OF THE HOSPITAL PHYSICIAN TO THE HOSPITAL SURGEON.

THE existing unwritten, yet inflexible, laws governing the actions of the members of a hospital staff in regard to one another are becoming, at the present time, so unsuited to the demands made by the rapid progress and subdivisions of medical science as to require serious innovations if the benefit of patients is to be considered as a more important matter than the preservation of professional ethics. Our attention is called to this growing evil by the generally acknowledged fact that the various branches of medical science are each becoming so vast in their scope and minute in their individual technique that no one is capable of carrying out successfully all of the operations or therapeutical measures which patients of every class may present. We fear that some surgeons and physicians still believe themselves able to treat all the ills to which man is subject, without calling in the aid of any of their brethren, and that there are others who, from pecuniary motives alone, neglect to send a patient to a more experienced friend because they will lose the case. This lack of humanity and abuse of professional confidence are not, however, the evils at which this editorial is aimed. What we complain of is the lack of recognition on the part of the boards of managers of hospitals of the fact that the staff should consist of a body of men not all general surgeons or physicians, but some of them specialists in the important parts of medicine and surgery. Either this fact must be recognized, or the individual members should be allowed to call into their wards, in consultation or for operation, friends who in their opinion are qualified to assist or take entire charge of a given case. At present this is considered a professional impossibility, yet every one who has occupied a position on a hospital staff must have experienced the difficulties of referring a patient to the care of his colleague, knowing when he did so that while his friend was an accomplished physician or surgeon, he was in reality utterly without adequate training for that particular emergency.

As an instance of this we may cite a case which was recently brought to our notice, in which a woman suffering from peritonitis of a frequently recurring type came under the care of a physician who had charge of a ward in a large hospital. The history of gonorrhœa and the entire atmosphere of the case showed it to be one demanding operative interference of a most skilled and experienced character, an experience confessedly lacking in the eminent surgeon on service at the same institution during the course of the case. Under these circumstances this surgeon would have been bound to operate if called on, since he could not refuse to perform an act so plainly indicated, nor could he confess his inability to do so through ignorance. There was, therefore, but one path left for the physician in charge; namely, to wait until the inflammation remitted in its violence, and then hurriedly to discharge the patient with a recommendation to call on a surgeon qualified to relieve her without exposing her life to unnecessary risk. In the case before us the surgeon attached to the hospital had enough conceit to believe himself capable of operating on anything, but the subsequent history of the case proved that only the most dexterous and experienced of men could have possibly saved the woman's life, because of the extensive abdominal lesions produced by her disease.

If the physician had referred his case to his colleague with his knowledge of his colleague's inability to treat it, the one would have been but an accomplice to a professional murder, and the other a man who, by the force of existing laws and his conceit, must forever have the awful responsibility of the loss of a human life resting upon his shoulders. In this

instance the remittance of the disease permitted the physician to do the best he could for his case, and he practically advised her to flee from the hands of his colleague; but had no remittance in the disease taken place, he would have had to be content with letting her die on his hands, or of sending her to her death in the surgical wards. We cannot clearly see our way toward remedying this evil, but the evil exists, and as such should be remedied, and if any of the readers of THE MEDICAL NEWS can recommend a plan we shall be glad to hear from them. The mere appointment of specialists does not entirely avert the danger, since the individual so appointed may not entirely command the professional confidence of his colleagues in every case which appears. No practitioner sends all his private cases to one surgeon or physician, but selects for each case the professional brother best qualified to take care of the diseased process suffered from.

CORRESPONDENCE.

MILK INSPECTION IN CINCINNATI.

To the Editor of THE MEDICAL NEWS,

SIR: In THE MEDICAL NEWS of June 21st your Cincinnati correspondent indulges in some statements in regard to the dairies and milk-supply of this city, which are not only sensational and untruthful, but reflect very unfavorably upon all who have heretofore held the position of Health Officer. No such state of affairs as is depicted by your correspondent has existed for years, if ever, in this city. All of Dr. Prendergast's predecessors have paid much attention to the dairies and milk-supply, and very few cities in the country have had better milk than this has had.

For the last four years the office of milk inspector has been filled by an honest physician, who was very attentive to his duties, and was well versed in chemical analysis, and who had as assistants competent and trustworthy inspectors of dairies; and their weekly reports to the Health Office showed that their duties were not neglected.

If your journal were read only by Cincinnati subscribers no reply to your correspondent would be necessary; but to those who do not know the absurdity of his letter, I desire to say that his statements that "the dairies were in an appalling condition," that "in some, the cows stood up to the knees in filth," and that "many of them had not been liberated from their stalls for more than a year," are utterly devoid of truth, and that his letter is but an attempt to write into notoriety a set of newly ap pointed men who were absolutely ignorant of the duties they were expected to perform.

Yours respectfully,

BYRON STANTON, M.D.,
Ex-Health Officer of Cincinnati.

To the above letter our Cincinnati correspondent replies as follows:

To the Editor of THE MEDICAL NEWS,

SIR: In the letter which I had the honor of contributing to THE MEDICAL NEWS of June 21st, it was my aim to give you the opinions of the local medical profession, and not my own ideas; and I was particularly careful to consult the best available authorities with reference to the truth of every statement before its publication. When, therefore, Dr. Stanton takes exception to my letter, he flatly denies, not merely the veracity of a newsmonger, but the official action of the Cincinnati Academy of Medicine, of which he is a member, the verdicts of the daily press, compiled at great length and with many illustrations, not from the reports of the Health Office, but from personal investigation by reporters, and, I might add, from the confessions of dairymen who made no denials but pleaded inability to obey the law profitably. What there was, therefore, of the "sensational" in my letter was of the character which is inherent in the description of a dire calamity of large proportions, though it be the slaughter of innocent babes through the ignorance and carelessness of milk-producers. Through personal regard for Dr. Stanton and the esteemed physician who was associated with him as milk-inspector during his term of office, as well as at the request of the present Health Officer when interviewed, I not only refrained from criticism or censure of previous officers, but distinctly stated in the letter referred to, that "In the revelations which have been made there has been no attempt to reflect unfavorably on the official career of previous health officers, and no such reflection should be made. The fault lies not with those who have occupied the office . . . but with the city government." I heartily agree with Dr. Stanton as to the official honesty and professional ability of himself and associates in office, and have still no desire to criticise them.

But, when the ex-health officer selects from my letter the statements that the "dairies were in an appalling condition," that "in some the cows stood up to the knees in filth," and that "many of them had not been liberated from their stalls for more than a year," and asserts that they are utterly devoid of truth, I most respectfully but emphatically deny and refute his statement. On the evening of May 12th, the Cincinnati Academy of Medicine unanimously adopted a resolution of which the following is a part:

"*Resolved*, That we have witnessed with much surprise and alarm the exposures recently made by the Health Department of our city under the direction of Health Officer Prendergast, of the appallingly unsanitary condition of a large number of the dairies which supply us with milk, but we fully endorse the efforts of the Department to correct the existing evils . . . that we tender to the Health Officer our earnest support, and urge him to continue his efforts to increase the efficiency of the Department in the same energetic and fearless manner as he has begun."

"Filth to the knees" was the condition described in the daily press, and I am informed that it is correct. It might have been an inch or two less deep, if the Jersey cow was taken as the standard of measurement, but the fact remains that the filth was there, and that the cows stood in it. Even worse, an eye-witness informs me that in at least one instance the cow's udder was so besmeared that this same filth dropped from the fingers

of the milker into the pail, and remained there until the milk was strained.

The *Cincinnati Lancet-Clinic*, May 17, 1890, says editorially:

"From time out of mind Cincinnati has been greatly cursed with a stock of dairies that have had a place and habitation within the city precincts, where the cows were almost wholly fed on distillery slops and starch grains. As if this were not bad enough, the poor unfortunate animals are, month after month, confined within the stables, and often standing in their own filth; while, to make the condition as bad as possible, the frame sides of the sheds are, in the fall, as hermetically sealed as possible with the dung of the cattle."

Now, whom are we to believe? If the letter of June 21st was "utterly devoid of truth," what of these other statements? and if these were false why did not the injured ex-health officer immediately cry aloud and at home? Why did he select for refutation (?) a letter in which his official career was vindicated in preference to those in which he had been less kindly dealt with? His statement, that no reply would be necessary if read only by Cincinnati subscribers, is as aqueous as any of our milk.

If the letter of June 21st was "intended to write into notoriety a set of newly appointed men," it came too late, when prompt and energetic devotion to duty had already made them "notorious." And if these neophytes were "utterly ignorant of the duties they were expected to perform" (can he refer to obligations to the dairymen?), then may we thank the kind Providence that sent us men thus ignorant, Democrats though they be!

MODIFIED CHEYNE-STOKES RESPIRATION.

To the Editor of THE MEDICAL NEWS:

SIR: The article in THE MEDICAL NEWS of May 31, 1890, by Dr. Norton Downes, on "Cheyne-Stokes Respiration," brings to mind a case that I met with last autumn.

A boy, between three and four years of age, had had a severe attack of diphtheria, but had recovered from its immediate effects. The membrane had disappeared from his throat and nostrils, and his physician thought that there would be no further obstacle to recovery. The child, however, continued debilitated, and seemed unable to regain his strength. Some days later I was called in. The parents had become alarmed at a peculiarity of the breathing that had developed. This peculiarity was like that of the cases referred to by Dr. Downes as having been reported by Dr. William O'Neil, viz., deep inspirations, with long intervals of rest. This was particularly noticeable when the child was sleeping, either in the night or day. Sometimes there was very little noticeable in his respiration except an occasional long breath, but when he fell asleep the peculiar respiration would occur, sometimes to such an extent as to alarm the parents and friends. At no time was there the quick shallow respiration, followed by the period of apnœa, so marked in well-developed cases of Cheyne-Stokes respiration. Examination showed that his heart was weak but regular in action, the pulsations ranging from 110 to 120 per minute. Throughout the case there was no cyanosis or rise of temperature. On testing the urine, which was diminished in quantity, I found abundance of albumin, but at no time was there any dropsy, other than slight puffiness about the eyelids and lips. Constipation was present, and the complexion was of that clayey, unhealthy appearance, not uncommon after diphtheria, and always present in anæmic and dropsical patients. Some days after my first visit, paralysis of the palate began, and continued until it was almost complete. In spite of the fact that the condition of the kidneys improved, as shown by urinary tests, and by the improvement in the respiration, the child continued to grow weaker, and while there was no actual paralysis of the lower limbs, the patient was unable to walk. After careful treatment for about six weeks, I regarded him as convalescent, and he finally completely recovered.

The points of peculiar interest in this case are, that the difficulty in respiration increased during sleep, yet at no time was it sufficient to keep him awake; and that there was no cyanosis. My explanations of these peculiarities is that the case was one of uræmic poisoning, and the centres of respiration were benumbed by the poison circulating in the blood, yet not sufficiently so to prevent the child's recognizing the want of air when awake.

Now, during sleep the centres failed to act, except when the *non-aërated* blood roused them to action, and when the need of oxygen was felt. By the expression "*non-aërated* blood," I mean blood deprived of a certain amount of oxygen, and carrying enough carbonic acid or uræmic poison, or both, to overcome that state of inactivity, and to cause the respiratory centres to respond. In thinking over the matter of cyanosis, I have concluded that the deep, full inspirations at intervals, really furnished almost as much air in a given time as is normally furnished, and that while the respiratory centres were so influenced as to cause irregular breathing, yet they were sufficiently active to respond before the lack of air was so great as to cause cyanosis.

W. R. CUSHING, M.D.

DUBLIN, VA.

ABSORPTION OF BONE-SPLINTERS.

To the Editor of THE MEDICAL NEWS,

SIR: The question as to the extent to which splinters of bone detached from the periosteum may be absorbed is an interesting one. It has seemed to me that the possibility of absorption might be greatly increased by appropriate measures. The cases that have come under my observation in which this condition was supposed to exist were not verified by post-mortem examination, and it is on this account that I take the liberty of suggesting the following points as perhaps worthy of the attention of those who may have greater opportunities for their verification.

It is evident that even slight irritation due to motion of the fragments of the delicate granulation tissue surrounding splintered bone tends to produce swelling and stasis, which prevent absorption. If in the effort to prevent such motion bandages are drawn too tightly, absorption is interfered with. I have seen two instances, at least, in which, so far as could be judged from the symptoms, a long bone had been

splintered so as apparently to separate fragments from the source of their periosteal blood-supply. In both, however, absorption seemed to have taken place and to have become complete without suppuration, at the end of several months. It was thought that this result was due, in part at least, to the treatment adopted, which consisted in the prolonged application of the ideal elastic pressure secured by means of splints which had been upholstered with curled hair. By means of such splints it is possible to hold the parts immovable with comparatively gentle pressure and without any tendency to strangulation and consequent pain and swelling. Moreover, they are light, cool, and comfortable. Certainly, in the difficult and tedious cases mentioned, they contributed to the favorable result, whatever may have been the precise pathological condition.

M. A. VEEDER.

LYONS, NEW YORK.

NEWS ITEMS.

A Successful Cæsarean Section by Candle-light.—D. F. Albert Mouillot, in the *British Medical Journal*, June 28, 1890, reports a successful case of Cæsarean section in a woman four feet eleven inches in height. The distance between the anterior superior spinous processes was only eight inches. The operation was done by candle-light in a peasant's house, and with no other instruments than those of a pocket-case. Dr. Mouillot attributes the recovery to the fact that the woman was not exhausted before the operation, and that strong uterine contractions followed.

A Fatal Epidemic of Whooping-cough.—The *British Medical Journal* states that the mortality from the epidemic of whooping-cough now pevailing in Aberdeen, Scotland, is exceptionally high. During the month of May one case in every eight proved fatal.

Increase of Insanity in England and Germany.—It is computed that there is an annual increase of 300 to 400 lunatics in London. A new asylum for the accommodation of 2000 patients has been begun, and will be finished in about two years. At the present rate of increase of lunacy in that city a new asylum will be required every five years. The population of the city is stated to increase about 80,000 per annum, so that a large lunacy increase is explicable.

It is stated that in the German Empire during the past five years there has been an increase of 25 per cent. in the number of cases of insanity, against an increase of 3.5 per cent. in the population.

Artesian Water-supply at Memphis.—The new artesian water-supply of Memphis, Tenn., is probably as perfect as that of any city in this country. According to the *Bulletin of the Tennessee State Board of Health*, the supply is practically inexhaustible, such is the capacity of the water-bearing sand, and it is estimated that, however great the amount of water used, no impression can be made on the subterranean river of supply. It is assured that clear water, free from admixture with river water or surface drainage, can always be obtained. This is rendered probable by the fact that there is an upward pressure from the wells to a point that is higher than the high-water mark of the Mississippi River. The water, as delivered from the wells, is sparkling and transparent, and is unaffected by rains or by turbidity of superficial streams. Its fountain-head must be at a distance of many miles. The system for gathering, storing, and distributing, has been constructed in an unique and admirable manner, and, from a hygienic point of view, its introduction is a blessing to all concerned, and the system will be a model to other cities in the valley of the Mississippi.

The Code of Ethics of Oregon.—In a bill before the Oregon legislature, for the regulation of medical practice, there is a singular clause providing that licences to practise may be revoked for "unprofessional conduct," which is defined in the bill as: (1) Participation in criminal abortion; (2) employing "drummers or steerers;" (3) promising to cure an incurable disease, and taking a fee therefor; (4) betrayal of a professional confidence; (5) advertising in a false or exaggerated manner; (6) advertising to regulate the menses of women; (7) conviction under some charge implying "moral turpitude;" (8) habitual intemperance. Like many other newly settled communities, Oregon has greatly suffered from quacks and advertising adventurers.

THERE is a movement on foot at Paris to establish a polyclinic, conducted similarly to those of Vienna and Berlin.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF THE MEDICAL CORPS OF THE U. S. NAVY FOR THE TWO WEEKS ENDING JULY 12, 1890.

P. H. RIXEY, *Surgeon.*—Leave of absence granted for fifteen days.

F. M. OGDEN, *Assistant Surgeon.*—Promoted to be a Passed Assistant Surgeon.

S. STUART WHITE, *Assistant Surgeon.*—Promoted to be a Passed Assistant Surgeon.

L. W. ATLEE. *Assistant Surgeon.*—Granted three months' leave of absence

T. WOLVERTON, *Medical Inspector.*—Awaiting orders to the U. S. S. "Philadelphia."

P. A. LOVERING, *Passed Assistant Surgeon.*—Awaiting orders to the U. S. S. "Philadelphia."

D. MCMURTRIE, *Medical Inspector.*—Granted leave of absence for thirty days.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT, U. S. ARMY, FROM JULY 8 TO JULY 14, 1890.

By direction of the Secretary of War, the leave of absence on surgeon's certificate granted MARCUS E. TAYLOR, *Captain and Assistant Surgeon*, in S. O. 45, June 13, 1890, Division of the Pacific, is extended five months on surgeon's certificate of disability, with permission to go beyond sea.—Par. 6, *S. O. 159, A. G. O.*, July 10, 1890.

THE MEDICAL NEWS *will be pleased to receive early intelligence of local events of general medical interest, or of matters which it is desirable to bring to the notice of the profession.*

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